Universal modular MWD platform adapted for your needs
Axel provides innovative and affordable Measurement while drilling (MWD/LWD) products for oil and gas companies.

Our hardware and software solutions offer powerful customization options to simplify the work of the MWD engineers while improving drilling performance.

Our products are currently in use on onshore and offshore rigs all over the world.

**Advantages**

- **Universal:** equipment from different manufacturers in a single BHA
- **Adaptable:** simple integration of new third-party equipment
- **User-friendly:** a simple Plug & Play capability for connecting new equipment
- **Fast:** efficient and fast protocols for transmitting data from the downhole telemetry tools to the surface
- **High quality:** 100% signal decoding on the surface with added quality control
- **Functional:** cutting edge data processing methods
- **Flexible:** customizing solutions for each client
- **Support:** 24/7 technical support service available

**Axel InterConnect** is compatible with the most popular MWD systems and consists of the following modular products:

**Axel Vision** state-of-the-art software which processes all data recorded while drilling.

**Axel Surface Unit** a universal surface system providing 100% signal decoding.

**Axel Turbo** a downhole accelerator used to speed up data transfer from the downhole tools to the surface while also optimizing power consumption.

**Axel Bridge** a downhole module with embedded software which allows for connecting downhole tools from different manufacturers into one BHA.

**Axel InterConnect** standardizes communication between MWD/LWD tools from different manufacturers while increasing data transmission rates and greatly improving surface processing.

**Axel InterConnect** is a universal modular platform designed by Axel that integrates MWD tools from different manufacturers while increasing data transmission rates.

Today the economic success of many drilling operations depends heavily on the availability of real-time downhole drilling information. Oil and gas companies expect MWD/LWD systems to transmit high-quality data in real time.

Nevertheless, most MWD systems have low data transmission rates and are incompatible with downhole sensors from different manufacturers.

Current data transmission tools use outdated and ineffective algorithms. MWD/LWD software does not meet the international industry standards.

**Axel InterConnect** is the fastest and most commercially-effective data transfer solution. Its universal scalable architecture allows for expanding the range of transmitted data by simply connecting additional downhole tools.

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**AXEL BRIDGE**

Axel Bridge is a universal downhole module used to interconnect telemetry tools from different manufacturers.

**ADVANTAGES**
- **Universal:** supports the most popular physical interfaces used in downhole telemetry
- **Embedded software:** built-in digital platform for protocol conversions
- **Bidirectional:** Axel Bridge can be installed in any part of MWD tool string in any direction
- **Live tracking:** internal memory with smart logging algorithms

**USAGE**
- **Low power consumption:** 20 mA @ 28 V or 15 mA @ 36 V
- **Wide input voltage range:** 18–36 V
- **Length:** 40 cm
- **Diameter:** 36 mm
- **Temperature range:** 150 °C (175 °C)
- **Input/output interfaces:** RS-485, RS-232, Q-BUS, CAN, and others

**SPECIFICATIONS**
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**AXEL TURBO**

Axel Turbo is a universal downhole module which provides high speed data transmission to the surface. Combinatorial algorithms used by Axel Turbo facilitate data transfer at higher data rates and lower power consumption as well as data quality control on the surface.

**ADVANTAGES**
- **Broad compatibility:** compatible with different MWD systems and mud pulsers
- **Data transfer rates up to 3 bits/sec:** additional gains in speed are the result of advanced algorithms based on a second pressure transducer
- **Power optimization:** power management for up to 4 batteries, and compatibility with downhole generators from different manufacturers
- **Lossless data transfer:** use of error correction codes (ECC) results in lossless data transfer
- **Customizable configuration:** ability to create custom sequences and parameters, and set up properties for each transmitted parameter such as resolution, bit count, scale, and others
- **Live tracking:** internal memory with smart logging algorithms

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- **Wide input voltage range:** 18–36 V
- **Length:** 40 cm
- **Diameter:** 36 mm
- **Temperature range:** 150 °C (175 °C)
- **Compatiblity:** with the most popular MWD systems based on Tensor, Bench Tree, Toltoq, Enteq XXT, APS, COMPASS, and more
**ADVANTAGES**

- **Fast:** used in conjunction with Axel Turbo
- **Universal:** compatible with all MWD systems on the market
- **Efficient:** saves between 2 and 4 hours per day of survey time while minimizing the risk of stuck pipe
- **Improved signal decoding quality** despite pump noise, tool movements and other sources of interference
- **Stand alone:** integrated depth tracking system
- **Reliable:** all raw data is saved in the unit’s memory in case of a PC crash; memory up to 2 TB (up to 5 years of logging)

**AXEL SURFACE UNIT**

Axel Surface Unit designed to be a universally-compatible surface system which processes data from different downhole MWD systems in real time. Axel Surface Unit helps the MWD engineers improve decoding quality up to 100% despite noise from pumps, poor mud properties, drill string movements, and other sources of signal interference.

The system contains all necessary tools for the MWD engineers to fully control the process of decoding and depth tracking.

Axel Surface Unit helps service companies simplify and unify surface equipment and software regardless of the downhole equipment manufacturers.

Axel Surface Unit is easy to operate: one drilling run is sufficient to master the tools and appreciate its features.

**SPECIFICATIONS**

- **Supplied with**
  - USB/LAN
  - Power cord
  - Programmer
  - Axel Decoder Software install package
  - Operating Manual

- **Power supply**
  - 100–240 V
  - 50–60 Hz
  - 10 W

- **Operating temperatures**
  - 0...+70 °C

- **Storage temperatures**
  - –10...+85 °C

- **Sensor connectors:**
  - Pressure and hookload: 4–20 mA, current loop; intrinsic safety certified for Zone 1, Divis.2
  - Depth tracking: NAMUR; intrinsic safety certified for Zone 1, Divis.2

**ADVANTAGES**

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**ADDITIONAL TOOLS**

- Interface for depth tracking system
- Diagnostic tools for surface equipment

**DIGITAL SIGNAL PROCESSING**

- Flexible filter chain wizards
- Special filters for particular types of signal noise
- Tools for adjusting filter chains and monitoring their performance

**DECODING**

- Universal wizards for data transmission protocols
- Artificial intelligence algorithms and machine learning techniques for pulse classification
- Manual decoding toolkit for difficult cases

**SUPPORT OF DIFFERENT DATA TYPES**

- Ability to upload configuration files generated after programming the MWD system from different manufacturers
- Save all settings and preferences into specialized session files
- Logging of all raw decoded data on hard drive (in parallel with storing the data in the Axel Surface Unit on board memory)

**SYNCHRONIZATION WITH THE OFFICE**

- Axel Decoder Desktop for working with files acquired from the rig site
- WITS-in / WITS-out

**AXEL DECODER**

Axel Decoder is interactive software for operating Axel Surface Unit with a wide range of tools
**Axel Vision** is a software system for processing data while drilling. The way we developed Axel Vision is based on detailed analysis of the best MWD/LWD software solutions in the industry, experience of MWD professionals worldwide, and the requirements provided by international service and oil and gas companies.

High-speed visualization, state-of-the-art methods for real-time processing of geophysical data, and availability of the built-in data processing module — all that makes Axel Vision customizable for all MWD systems on the market.

**UNIVERSAL**
- Compatibility with all MWD systems on the market
- Processing methods and corrections for different downhole sensors including resistivity and gamma
- Universal graphical tools for visualizing all parameters in diagrams, indicators and tables

**MATHEMATICAL ALGORITHMS OF DATA PROCESSING**
- Survey quality control
- Survey correction algorithms (Short Collar, SAG, etc.)
- Geomagnetic model support
- Proprietary universal model for resistivity processing
- Proprietary universal for natural gamma radioactivity processing

**INNOVATIVE TOOLS**
- Automated determination of problematic zones in well logs
- Convenient algorithms for removing peaks and increasing data density

**DATA PROTECTION**
- Compact data storage
- Creating automatic/manual return points
- Secure raw data storage

**SENDING DATA TO THE OFFICE**
- Full WITS/WITSML support
- Simultaneously send data to the service company and the operator-company
- Customizable preferences for each data channel
- Setting special sending rules for each parameter
- Fast adaptation of the standard format to the client’s requirements using flexible constructors

**REPORTS**
- A set of pre-installed templates for different clients
- Creating report packages (pdf + las + surveys) with one click
- Immediate emailing reports in a zipped archive format
- Report export log with an option of forwarding
- Support of all graphic and digital report formats

**SUPPORT OF DIFFERENT DATA FORMATS**
- Loading data from a MWD system memory
- Saving/loading measurement files and las
ABOUT AXEL

In 2012, Axel was formed to satisfy a market need for standardized communications in MWD/LWD Systems in challenging environments.

To that end, Axel gathered a team of highly-experienced professionals in programming, electronics, and MWD/LWD to develop world-class telemetry solutions. Our organization is dedicated to improving the industry through our MWD/LWD product lines.

The first Axel Surface Unit prototype was designed to decode signals from the downhole assembly and was field-tested in 2013. In early 2014, Axel began shipping its new surface tools to customers and a mere six months later it had expanded its sales territory to include Iraq, Russia, USA, Kazakhstan, Indonesia, Turkey, and the Netherlands.

Axel is currently designing universal downhole tools and surface systems to international standards for measurement while drilling.

Between its superior technical specifications and cost-effectiveness, the Axel MWD system is well-positioned to win a significant share of the global market of telemetry equipment.

“Taking into account for better quality, ability to save problematic job, I would highly recommend using the Axel Surface Unit with your MWD Systems”

Cougar Drilling Solutions

“After drilling several wells, it became obvious that the Axel Surface Unit works significantly better than its counterparts from the original manufacturers”

Transmark EDS

TEST DRIVE

Axel Test Drive includes a comprehensive set of performance tests (conducted with our full technical support) which provide a demonstration of our product’s capabilities.

Axel continuously develops new products in co-operation with drilling and technology companies around the world

Please contact us at info@axelmwd.com for more information on Axel product testing options in the field.