Overview:

The KIDM is a full featured 185°C Directional Module designed and manufactured by KeyDrill for Q-Bus based MWD systems. At a total length of 29.7 inches, the KIDM integrates both the MPU and TPS, eliminating separate units and their associated cost and interfacing. It's a plug-and-play High Temperature Directional Module compatible with QDT legacy tools.

Utilizing 185°C Quartz Flexure Accelerometers and proprietary 200°C Precision Flux-Gate Magnetometers, the KIDM is designed to operate reliably at 185°C and provide accurate and repeatable measurements including Continuous Inclination (RInc) and Continuous Azimuth (RAzm). Its qualification and calibration to 185°C ensures performance in the most demanding 'hot-hole' applications.

In addition to all the standard Survey Measurements, Drilling Dynamics, Battery Voltage and Gamma, KeyDrill provides advance features such as Realtime Compressed Azimuthal Gamma, Rotation Sequence Switching, Asynchronous Downhole Alerts, 36 Generic variables, Rotation Downlink and more. For a complete list see the next page.

Specifications:

Inclination Accuracy	+/- 0.1°
TF/Rotation Accuracy	+/- 0.5°
Azimuth Accuracy	+/- 1.0°
Operating Voltage	+18V to +36V
Active Power Consumption	0.9W
Quiescent Power Consumption	0.3W
Protocol	Q-Bus
Length	29.7" (754.38mm)
Operating Temperature	-25°C to 185°C
Survival Temperature	-40°C to 190°C
Vibration	30g pk 50 – 1000Hz 20g rms 50 – 1000Hz
Shock	1000g 0.5ms half sine

Features:

- ✒ 185°C Quartz-Flex Accelerometers
- ✒ 200°C Precision Flux-Gate Magnetometers
- ✒ Lower power consumption (~50% less)
- ✒ High-shock and vibe specifications
- ✒ On-board coefficients and Memory
- ✒ Q-Bus compatible
- ✒ High-Speed Telemetry (0.125 sec PW)
- ✒ Pressure/Rotary Downlink
- ✒ Azimuthal Gamma Compression Support
- ✒ Continuous INC (RInc) and AZM (RAzm)
- ✒ Realtime Shock/Vibration Measurements
- ✒ RPM & Stick Slip Detection
- ✒ Third party tool support (36 Generic Variables)
- ✒ KeyDrill Specific Features (see details on next page)

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Rotation Flag (RotF) and Rotation Sequence (RSq)

The KIDM module has a rotation flag and configurable rotation sequences. This enables the transfer of different data sequences while sliding or rotating.

Real-Time Rotation Detection (RTRD)

RTRD can detect rotation real-time and will automatically switch the sequences between TSq and RSq in about 30 seconds without the need for a rotation flag. Data is delivered in real-time to increase ROP and maximize data efficiency.

Downhole Alert System (DAS)

KeyDrill's DAS will transmit a warning alert following its specific value to surface when the data is out of its pre-defined tolerance. With the KIDM there is no longer a need to program Shock, Vibe, Stick/Slip, Battery Voltage, or Temperature in the logging sequence as well as Mag Field, Dip Angle, and Gravity in the Survey Sequence. This allows for quicker surveys and better logs without sacrificing crucial data.

Continuous/Rotation/Sliding Inclination (RInc) and Azimuth (RAzm)

RInc and RAzm provide real-time continuous inclination and azimuth measurements and transmission while drilling. KeyDrill's proprietary algorithms significantly improve the reliability and accuracy of these RInc and RAzm measurements.

Realtime Stick-slip, RPM, Shock and Vibration Detection and Transmission.

The KIDM can detect stick-slip, RPM, shock and vibration in real time. It will transmit to surface the maximum stick-slip, shock and vibration levels between data sets. This information will enable the directional driller to achieve maximum drilling efficiency and prevent costly equipment failures.

Faster Raw Data and Resistivity Data Encoding Format

The KIDM supports faster raw data and resistivity data encoding formats, including floating point and logarithmic formats. These features save as much as 25% of transmission time while maintaining data resolution and accuracy.

Sleep Mode

There are two sleep modes available, Tool Sleep Mode (TSM) and Data Sleep Mode (DSM). Both modes allow the KIDM to turn off the pulser, saving power during transportation or while on standby. TSM allows the customer to assemble their MWD tools in the shop without worrying about battery usage during transport. DSM can be achieved by using zero parameters in its data sequence (TSq or RSq). KeyDrill's real-time rotation detection feature enables the tool to wake up when the tool starts rotation.

36 Generic Variables

The KIDM is an open system and supports 36 generic variables which allows for more sensors to be attached to the MWD String.

ReSync Control (ReSy)

The Resync function in the KIDM resends sync pulses whenever a new sequence begins. It provides special value after lost circulation and in underbalanced or volatile drilling conditions.

Rotation Downlink

Rotational downlink capability has been added, using the same command format as the pressure downlink for ease of implementation.

Rotation Simulation Mode (SimM)

Surface Rotation Simulation function in the MPU simulates tool rotation and makes testing the tool on the surface more convenient. The simulation includes a Rotation Flag simulation and rotation speed (RPM) simulation. The range of RPM simulation is 0-511.

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