

ANALOG vs DIGITAL LOGGING SYSTEMS

Digital vs Analog Logging tools explained - greater precision, higher sample rates & simultaneous measurements - why Digital is superior.

- Digital tools provide multiple logging measurements simultaneously at much higher sample rates
- Analog tools suffer from drift and are generally unstable. They need continuous manual adjustment to compensate for such problems
- Digital tools can log to much greater depths without loss of log data quality
- Digital tools provide significantly more precise measurements as they are not affected by analog artefacts (see table below)

ANALOG PROBES

Analog circuits are usually much more susceptible to noise (small, undesired variations in voltage). Small changes in the voltage level of an analog signal may produce significant errors when being processed.

Limited methods of transmission up-hole restrict number of channels and sample rate to low values.

Several wireline cores required to operate probes and allocation of each core can vary between probe types.

Tools require various power requirements to operate. The number of supplies and range can vary between probe types – Heavy surface equipment. Complex bulky surface equipment required for probes like optical or acoustic scanners.

Probes require extensive calibration of gain and offset so that measured voltages and currents can equate accurately to real geological data. This requires lots of expensive precision components in the probe or at surface in the logging unit.

Require extensive surface equipment usually large 19" racks for each probe type.

The information is plotted directly at surface limited information transfer or replay capability.

Calibration applied during a log - Log lost if calibration incorrect or applied incorrectly.

DIGITAL PROBES

Once sampled there is no loss in quality of each channel. Down hole processing done digitally with negligible drift or errors due to noise.

Information can be compressed and multiple channels are easily transmitted up-hole - High sample rates and logging speed.

A maximum of 4 cores required and in a lot of cases only a single core required.

The logging interface supply one regulated rail for all digital probes – Small portable unit. Massive range of probes supported with one portable surface logging unit.

Sampled data can be calibrated and checked digitally within the probe. Look up tables can be used to compensate for any non-linearity in the measurement. Measurements depend on single precision reference used in the ADC.

Only single digital interface required - GeoHub.

Log is a stored digital file and can be transferred and replayed easily. Many different replay formats available.

Uncalibrated and calibrated data stored. Calibration can be applied during a log or applied later. Extensive log annotation can be applied and logs can be merged.