

Pulse Analogue Data Acquisition Systems

Software

The **Warrior Well Logging System** for pulse type tools employs advanced software and widely available hardware to provide a cost-effective solution to well logging requirements in cased hole applications.

The system supports most down hole tools using pulse type data transmission. It also includes a connector for input of analog signals allowing the system to be used as a data recorder. The operator interface includes a display of the positive and negative pulse heights (obviating the need for an oscilloscope), and discriminator levels may be set manually, or automatically by the software.

Services are predefined so that the operator simply selects the required services and is presented with a fully configured service set up with the last tool string and calibrations run. If other tools are to be run, the graphical tool string editor is used to select the required tool and load the appropriate parameters and calibrations.

Data monitors include raw and calibrated data of all sensors, including depth and line speed. Multiple log plot windows may be opened for comparison of, for example, main and repeat log sections. Log plots may be paused and scrolled to any depth and annotations added, while data acquisition continues.

Depth correlation may be performed while logging, with the screen plot and system depth updated until correct depth is attained. Log curve scales and other presentation parameters may be adjusted while logging and the screen plot redrawn until the desired output is obtained.

The hardcopy plotter may be stopped and started at any time, presenting any interval with any desired presentation format. Multitasking allows log-heading data entry, log faxing, and other ancillary tasks to be performed while logging continues. In this way rig time is reduced and logs are delivered faster.



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Cased Hole Data Acquisition Systems

Pentium™ or AMD Athlon Based Computer

The system normally uses a notebook computer with integrated USB port for data acquisition. The specification includes an active matrix screen and external ports for modem and mass storage device connection.

Tool Interface and Power Supply

A compact tool interface and power supply is provided which is suitable for the most down hole tools. It includes a tool power supply, depth encoder and line weight sensor interface, as well as circuitry for pulse detection, collar logging, and analog inputs as previously mentioned. The primary functions of the tool interface are controlled from Windows by means of slider bars.

Hardcopy Support

Generation of the final log print with heading, annotated log sections, calibrations, tool string diagrams, etc., is easily achieved. The system supports most well log plotter types currently in use, including color and the generation of multiple copies using fan-fold paper. The system also supports PDF and fax format file as a plot output, which may then be transmitted, to a remote fax machine using a conventional fax modem.

Typical Software Configuration:

Operating System

MS Windows 2000 or XP

System services include:

Calibrations	Linear, logarithmic, multi-point curve fit, tool specific, hardcopy output
Filtering	Box car, gaussian weighted, triangular weighted
Graphical Tool String Configuration	
Tool String Diagrams,	
Graphical Log Format Editor	Setup tracks, grids, curve types, colors, coding
Log Annotations	
Curve Labeling	
Real Time Data Monitors	Sensors, outputs, devices, waveforms, nuclear spectra
High Speed Multi-Well Log Database	Stores raw and computed data, service data, log heading information
Recalculation (Re-log)	From raw data,
Log Heading Editor	
System Setup Control	Depth Unit, Data Unit, User Interface Language, Display Parameter, Well Sketch, Real Time XY Plot, Merge, Splice and TVD Correction, Directional Survey Calculation, Graphical Curve Editor
Data Import and Export	LAS ASCII Read/Write, and LIS Read/Write.
Hoist Operators Display	On second monitor

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Acquisition Modules include the following services:

Gamma Ray
Gravel Pack
Neutron
Single Detector (most types)
Dual Detector
Collar Locator
Tracer with Real Time Interpretation
Multi-arm Calipers with Pipe Tally
Temperature,
Casing Inspection
Production Logging Analog Tools
User Defined Tools

Typical Hardware Configuration:

Computer

Laptop Pentium 4 or AMD (based upon available configuration)
512 MByte RAM 256K/512K Cache
80 GByte ATA 100 Hard Drive
AGP Graphics Display
1 Parallel I/O Port, USB ports
1.44 MByte Floppy Drives (based upon available setup)
DVD/CD-RW Writer
Keyboard with touchpad
14.1 TFT LCD Monitor (optional 15.1 Inch LCD Screen)

Tool Interface and Power Supply:

Bi-Polar Pulse Detection with PLL for increased resolution
Collar Logging 250V DC, 250 mA Power Supply
Depth Encoder and Line Tension
Analog Inputs
Integrated USB Hub

Plotter

Printrex
iSys/Veritas
Gulton.
HP DeskJet Color and Epson Stylus Printers.

Portable Carry Case (front encoder, line connections)

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