CW-EPR Digital Upgrade

The Latest Digital Technology for your ELEXSYS E500

The ELEXSYS spectrometer line is well-known for exceptional performance in advanced CW-EPR. The ELEXSYS has evolved to benefit from the latest digital technology and meet the demands of advanced EPR research.

Take your current ELEXSYS transputer/OS9 system to the next level, joining the new digital generation of CW-EPR spectrometers, by choosing one of our upgrade pathways.

The Digital Upgrade and Microwave Packages are designed to bring your spectrometer up-to-date with:

- Higher resolution
- Improved usability
- Increased stability
- Improved tolerance
- Greater sensitivity

New Field Controller and SPU

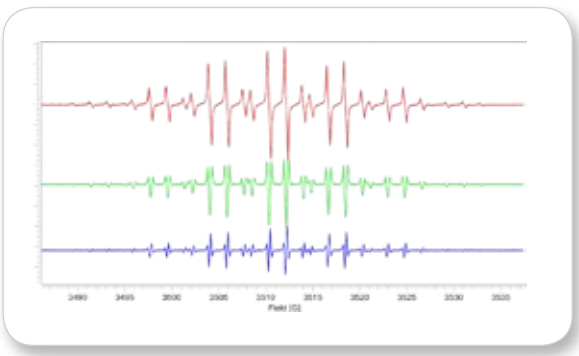
These new digital devices offer high dynamic range in both field and signal amplitude resolution, as well as supporting transient and rapid scan acquisitions.

Improved 32 bit Amplitude Resolution, Fast Digitizer and Rapid Scan Acquisition

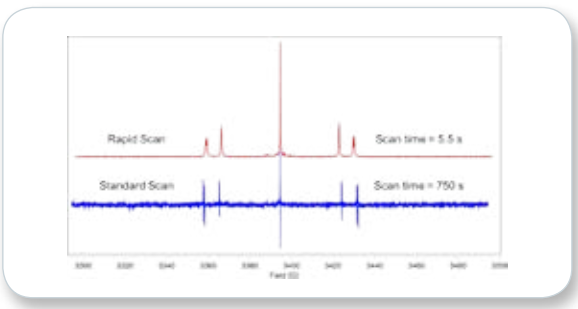
As a digital lock-in, the SPU provides unparalleled detection and digitization of both large and small signals with the same receiver gain, in a single scan. The SPU also functions as a fast digitizer for transient acquisitions and as a rapid scan driver for extremely fast field sweeps.

Lock-in:

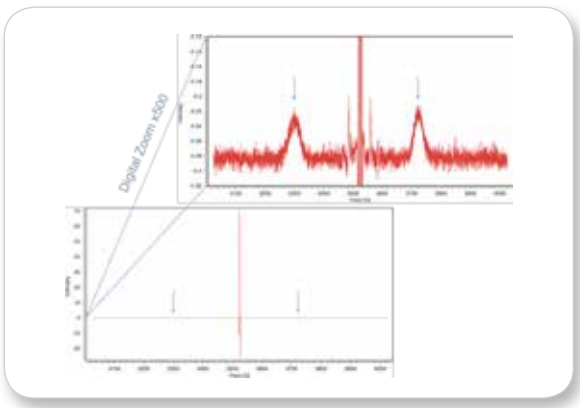
- Simultaneous detection of up to 5 harmonics
- Absorption and dispersion channels
- Up to 10 microsecond resolution for time scans



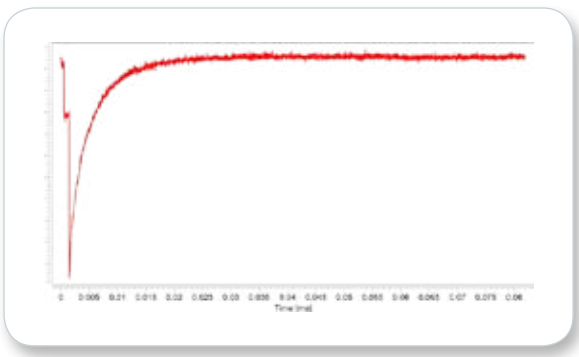
Simultaneous detection of 1st, 2nd and 3rd harmonics of PNT sample.



Single crystal EPR spectra acquired with SPU in rapid scan mode and standard field scan mode. Rapid scan total acquisition time of 5.5 s. Slow scan total acquisition time of 750 s.



2nd derivative CW-EPR spectrum of γ-irradiated quartz. The 500 fold digital expansion of the signal intensity axis reveals the low intensity peaks due to coupling of hydrogen atoms trapped in the quartz.



Saturation recovery EPR spectrum of solid nitroxide spin label using SPU fast digitizer mode with a 20 ns sampling time.

Signal Processing Unit (SPU)

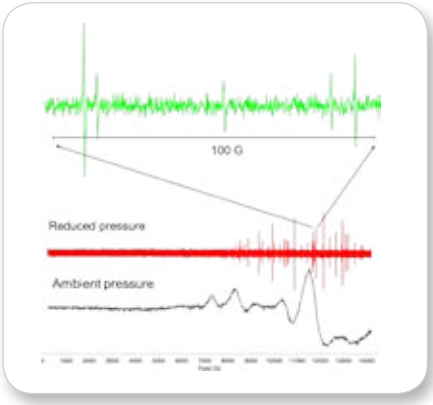
Fast Digitizer

- 125 MHz sampling rate
- 64 k on-board averages
- 16 k points in time domain

Rapid Scan

- 200 G sweep range
- Up to 16 k points

Upgrade Benefits



High resolution, molecular oxygen Q-band EPR spectrum. Zoomed area shows the resolved individual EPR lines of the low pressure spectrum.

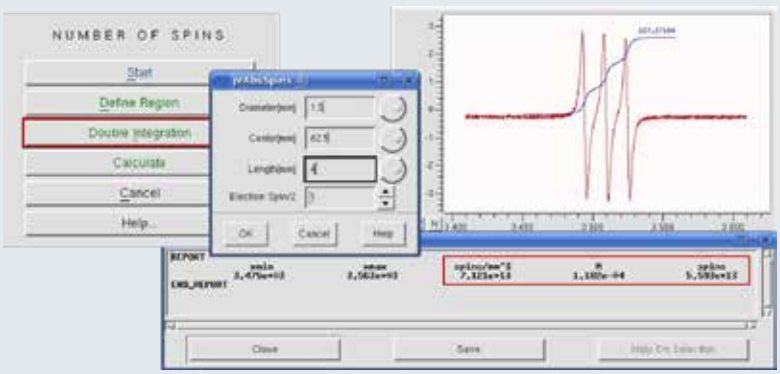
Field Resolution up to 256000 Points

Very high magnetic field resolution is feasible for both narrow and wide sweep ranges. The number of points in the field sweep experiment can be varied continuously from 2-256000 points.

Xepr Software Suite

New Xepr Features

- XeprAPI for Python® scripting interface
- High precision double integration tool
- SpinCount™ software module for quantitative EPR with no reference sample
- SpinFit™ software module for analysis of spin trapping data

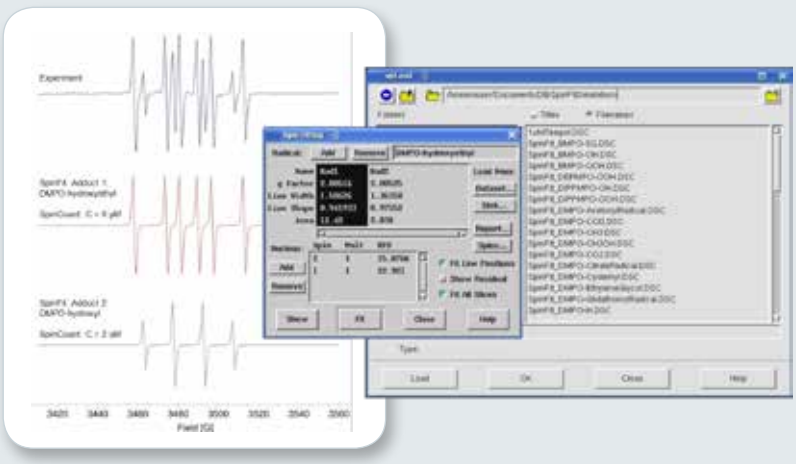


Xepr SpinCount™

- Reference free spin counting
- Single measurement
- Accurate result reporting and book keeping
- Easy-to-use, high precision method

Xepr SpinFit™

- Definition of adducts by input from spin trap database
- Fit adducts to experimental spectrum
- Determination of adduct concentration using SpinCount™



Upgrade Pathways

First Level: Digital Upgrade Package

Supreme Resolution, Precision and Usability

Hardware components:

- New signal processing unit (SPU)
- New field controller
- Integrated ethernet MW bridge controller
- DICE-II (optional)
- PC with LINUX® operating system
- LINUX acquisition server

Xepr Software Suite:

- All-in-one interface
- Extensive 2D experiment support
- SpinCount for quantitative EPR
- SpinFit: Spin trap fitting routine for identification and quantification of radical adducts

Second Level: Microwave Upgrade Package

Maximum Performance and Sensitivity

- Next generation SuperX microwave bridge
- SHQE probehead (if compatible with existing microwave bridge)

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