

## inspECT™ Eddy Current PCB

The newly-developed inspECT™ eddy current board was designed for PC-based eddy current testing. In combination with suitable software, the inspECT™ is a complete multi-frequency eddy current instrument, using an Ethernet interface for communicating to the control PC. Using a modular design concept and state-of-the-art digital electronics, the inspECT™ board (Eurocard format, 100mm x 160mm) permits single-frequency or multi-frequency, and single-channel or multi-channel operations (channel-multiplexing) with a multitude of sensor and frequency channels. The modular concept permits the expansion to a multi-frequency/multi-channel (8-, 16-, 32-channel) system via simple cascading procedures. The Ethernet interface is used for the parameterization of the board and to provide for data transfers to the PC. This approach allows the transfer of eddy current test data to the data acquisition/analysis PC over large distances.

### Technical Data

#### *Digital*

- SHARC DSP at 333MHz (real-time data processing)
- BLACKFIN Signal Processor at 600MHz (communication)
- Firmware, flashing (updating) via Ethernet
- 8 Opto-decoupled real-time outputs
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- 4 High-speed diagnostic outputs w/ LED indicators
- 4 Diagnostic/Mode DIP switches
- 8 Multiplexer-trigger outputs to control the sensor multiplexer

#### *Analog*

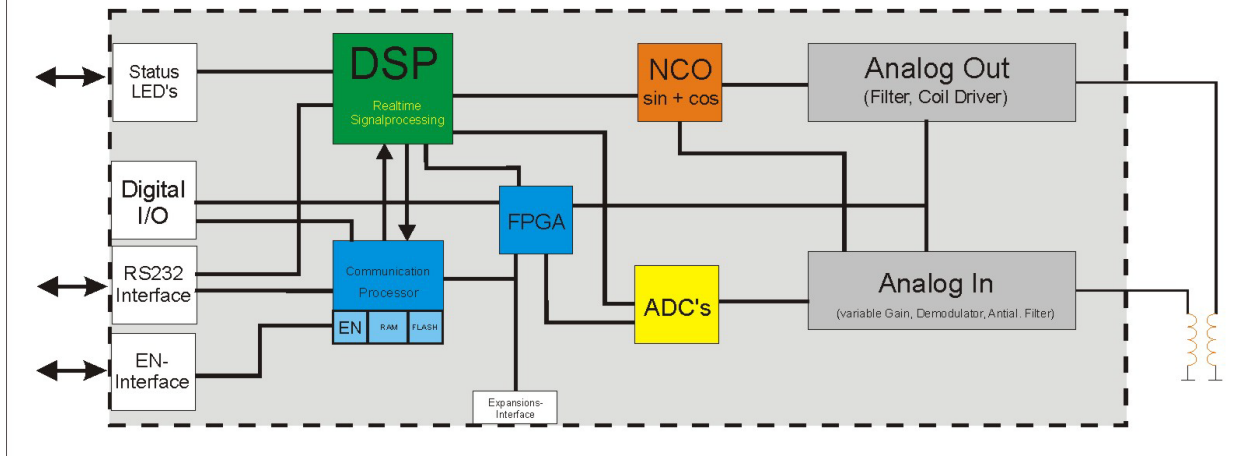
- Dual-NCO for test frequencies ranging from 100Hz to 10MHz, including stage filter
- Sensor driver ( $R_i = 50\Omega$ ),  $2.2V_{ss}$  at  $50\Omega$
- Sensor input  $50\Omega$ , alternative differential input at  $1k\Omega$
- 10-50dB HF gain with overload control
- Demodulation and anti-aliasing filter
- 2 x 16-Bit A/DC's

#### *Signal Processing*

- Maximum of 25,000 samples in single-frequency mode (digital decimation filter)
- Maximum of 4,000 samples in dual-frequency multiplexing mode

#### *External Interface*

- 100MBit full-duplex Ethernet interface for parameterization and data transfer
- 3-axis position coordinate interface (optional differential drivers)



## Technical Data and Performance Data

### Scanning Rates

High scanning rates at 25,000 Samples/sec in the single-frequency mode, permit testing of bolts at speeds of 17 samples per mm (100mm free-fall at 1.4m/s). The high computing speed, facilitated by the floating point DSP, permits data evaluation in several alarm windows. In the multiplexing mode, data can be sampled at rates of up to 4kHz (for test frequencies above 100kHz, or 1,800 samples/sec at 5kHz and 20kHz test frequency).

### Data Evaluation

Real-time data processing by the DSP permits the output of inspection results (acceptable/rejectable) immediately after data acquisition (maximum delay of 2ms).

### Process Control

The inspECT™ module provides 8 input/output interfaces with optoelectronic couplers for the integration of external process control features.

### Software

Driver software and standard user interface were developed under .NET in Visual C#. The user interface for data acquisition/analysis and relevant real-time DSP software can be customized to meet user requirements.