WS-98™
Eddy Current PCB
Technical Information

IZFP's WS-98 Eddy Current board is designed for PC-aided eddy current testing. In combination with suitable software, the WS-98 is a complete multi-frequency eddy current instrument. By using the modular design concept, the board permits multi-channel operations with a multitude of sensor and frequency channels. The broad analog bandwidth and subsequent numerical filters allow for contemporary signal processing algorithms and new testing concepts with high-speed multiplexing. Powerful data processing, real-time numerical filtering, and regression integrations are provided by the onboard digital signal processor (SHARC).

All hardware and firmware functions are software controlled. The software package, running under Windows9*, NT©, or Windows2000® consists of three software components: 1) PC software for setup and control of the eddy current system; 2) Master software managing the slave-specific ET parameters, handling of the time-multiplexing, processing of the SHARC data, and data transfer to the computer; 3) Slave software providing digital data filtering (data reduction, high-pass, low-pass, regression analysis), fast multiplexing of sensors and/ or test frequencies, setup of hardware functions (e.g., frequency generation, gain, A/D conversion, etc.), communication with data interfaces (serial port, Ethernet, etc.), and diagnostics for hardware/firmware functions.

Features

- Modular hardware and firmware design
- Extensive use of numerical processing replacing conventional analog circuitry
- High long-term stability, dynamics, and reproducibility of the ET signals
- Test frequency ranging from 10 Hz to 10 MHz
- A/D conversion at 16 bit (250 kHz cycle frequency)
- Time-multiplexing mode for sensors and/or frequencies at 8 kHz above 100 kHz test frequency (300 Hz at 500 Hz test frequency)
- High and low pass digital filters
- Online signal processing in multi-frequency mode for noise suppression and calibration of inspection targets
- Active, in-line cable and sensor drivers for sensor-to-instrument distance of more than 5 yards

Options

- External single-board and multi-board system
- Compact PC-integration with back plane BUS interface
- PCI-BUS single or multi-board system

PC Interfaces

To operate the WS-98 board, the board is interfaced with a computer running under Windows9*, NT©, or Windows 2000®.

- Ethernet Interface

  Figure 1 below shows the block diagram of the Base- and EN-Module outlining the analog module (including the A/D converter), the digital module with the SHARC processor, and the Ethernet controller. The functions of the WS-98 board are detailed in the analog and digital signal processing modules. The Ethernet controller is placed on the stacked M-Module board as shown in Figures 2 below.

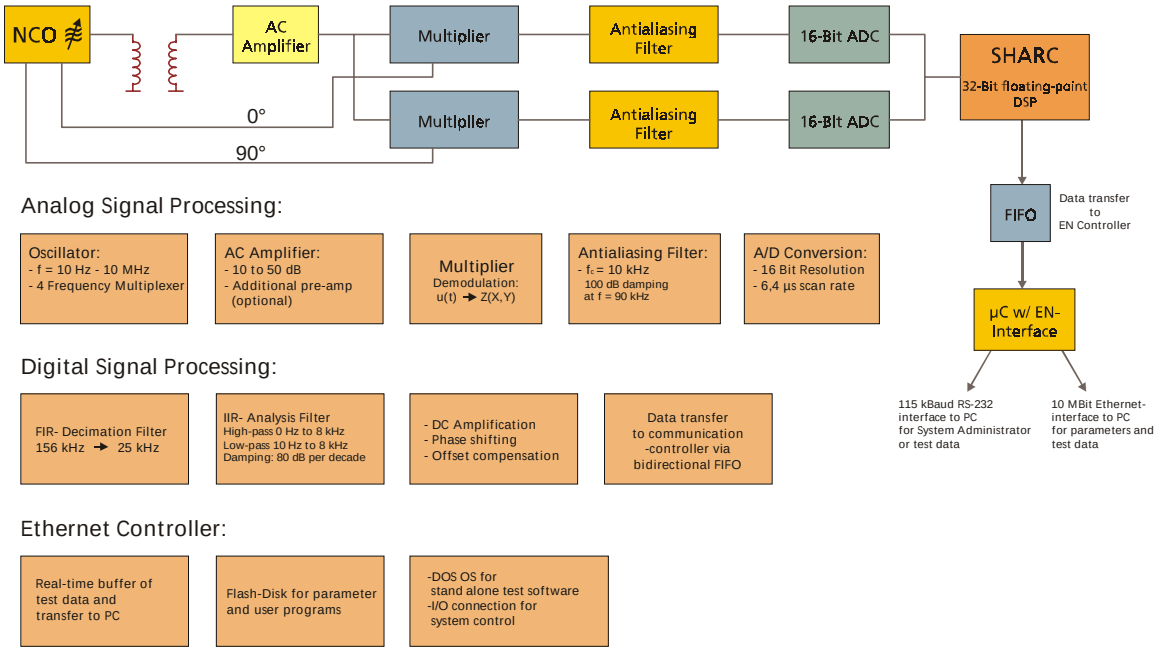

Figure 1: Base Module (Slave) and EN-Module

The Ethernet controller sports an embedded processor, which primarily consists of a CPU to provide all processing functions required by the TCP/IP protocol for communications with the host PC.

Figure 2: WS-98 w/ Ethernet Interface

- PCI Interface

The block diagram displayed in Figure 3 shows the configuration of the WS-98 with PCI interface. The PCI version is particularly advantageous for multi-channel (more than 3 channels) applications. The serial SPort-Interface (non-standard, proprietary development by ANALOG DEVICES) provides for the data transfer between slave and PC. A second SHARC processor (Master) on the computer side is required for the WS-98 to PC communications via PCI-Bus.

Master-DSP and PCI controller are located on a second board mounted (stacked) to the WS-98 as depicted in Figure 4.

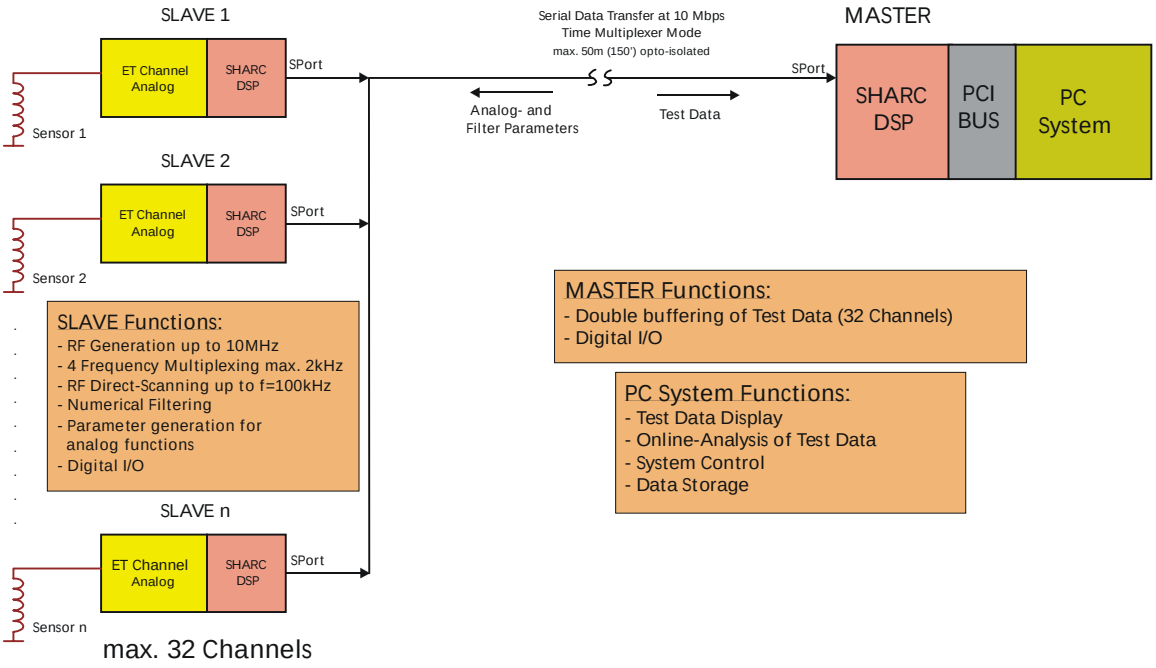

Figure 3: WS-98 w/ PCI-Bus Interface

Ethernet vs. PCI Interface

The Ethernet interface option is preferred for system configurations for up to three channels based on the following considerations:

- Low costs
- Standard interface; no installations inside the PC required;
- Independent from PCI board manufacturers (e.g., Estoril)
- Design with a guaranteed future
- Distance of up to 100m (300') between ET boards and PC
- Remote operation through local area networks (LAN)

For multi-channel applications with four channels or more, the PCI-Bus interface design is recommended due to data transfer capabilities. However, current Ethernet-processor developments promise data transfer speeds of 100Mbit available in the very near future, making the PCI-Interface for our applications obsolete.

Figure 4: WS-98 w/ PCI Interface