Fraunhofer
IZFP

FRAUNHOFER-INSTITUTE FOR NON-DESTRUCTIVE TESTING DRESDEN BRANCH

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1 *DMAS02-HF-Front*
2 *DMAS02-HF-Back*

MULTI-CHANNEL ACOUSTIC MEASUREMENT SYSTEM (MAS)

Fraunhofer-Institute for Non-Destructive Testing
Dresdern Branch

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Research Objective

Development of a multi-channel acoustic measurement system for long-term monitoring of technical structures and components. Application of active and passive acoustic techniques for nondestructive testing.

System

The system is based on digital components and customizable analog devices. The digital signal processor (DSP), standardized data transfer ports and the reconfigurable logic and software ensure individual system adaptability. The networking capability of the flexible MAS systems warrants the design of complex sensor networks to monitor a variety of system parameters.

Applications

The Multi-channel Acoustic Measurement System (MAS) is an energy efficient and application ready complete system for sensor networks.

The system uses guided waves for the monitoring of large structures. Damage indicators are identified by on-line and/or off-line analysis to provide information about the condition of the structure.

Typical Applications

- Aviation: Monitoring of complex airfoil structures (CFK structures)
- Industrial Plants: Corrosion monitoring of piping systems
- Wind Turbines: Monitoring of rotor blades (GFK structures)
- Monitoring of Production Processes: Structure-borne sound in production lines

Analog Input

- 4 differential input channels
- 12 Bit resolution
- 12,5 MHz sample rate
- Input level 10 Vpp, 100 Ohm
- Frequency range 10…500 kHz
- Post amplifier configurable for each channel -22…+20 dB
- Sensor identification

Analog Output

- 4 channel power amplifier
- Max. 160 Vpp bei 10 nF capacitive load
- Arbitrary Waveform Generator
- 14-Bit resolution
- 18,75 MHz output frequency

Modes

- Single
- Average
- Burst
- Continue for Lower Sampling Rates

Trigger Modes

- Free run
- External trigger
- Waveform Generator
- Signal Trigger RMS Fix, RMS Slide, RMS Window for each channel
- TTL trigger output

Device

- 24 V DC Input 300 mA
- Dimensions 45*111*115 mm
- Weight: 430 g (1lbs.)

Network and Communication

- CAN 2.0B 1 Mb < 40 m
- Max. 64 DMASxx per network
- Clock-synchronisation
- Trigger-Bus
- CF-Card data logger
- Real-time clock
- Optional: USB, Bluetooth

Digital Signal Processing

- Statistics (MAX, MIN, MEAN, RMS)
- Digital FIR filters
- FFT
- Spectogram