

Orchestra

The Ultimate Compact Real-time Data Acquisition Front End and Frequency Analyser



01dB-Stell
MVI technologies group

Orchestra

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Orchestra is made up of one or several modular multichannel hardware units and of the dBFA software suite dedicated to real-time data recording and frequency analysis.

Orchestra is a configurable and modular system containing separate and independent modules. No main frame is needed and all modules can be mounted very easily.

Three kinds of modules can be mounted together:

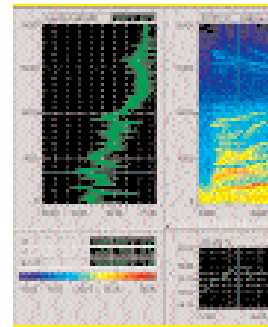
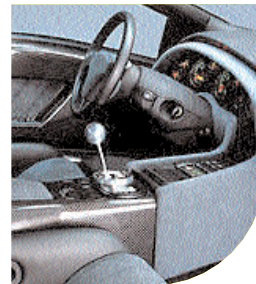
- Interface module allowing connection to PC through Firewire interface (IEEE 1394)
- Input module for 4 transducers with conditioning and 24 bits A/D conversion
- Function module adding features like output module for signal out or generator

One interface unit can manage up to 24 channels (6 input modules). Independent frequency sampling can be used on each input module. Several different input modules are available for Direct voltage/ICP® transducers, Microphones, Charge accelerometers, Thermocouple, Strain gage, Tacho sensors,...

A main unique feature of Orchestra is to allow a Multi-channel real-time analysis while recording on a PC hard disk.

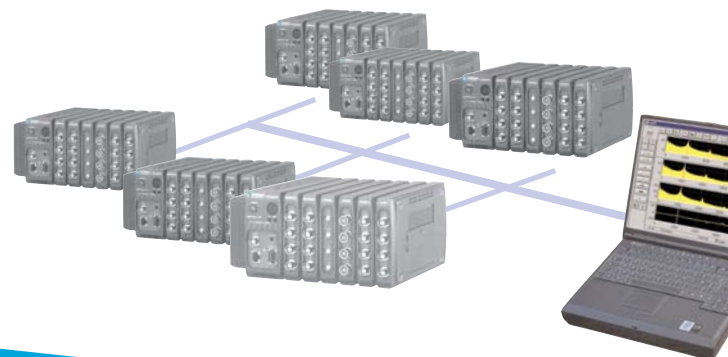
With the to Firewire interface capability, unrivalled feature is the network and distributed measurement performed with several Orchestra systems (two 24-channel Orchestra units constitute a measurement group). 192 channels can be measured and analysed at the same time with a maximum distance of 100 m between groups.

The dBFA software suite manages in real-time all data coming from Orchestra when it is used as a front end. The recording mode transforms Orchestra into a data acquisition front end and stores all signals on the PC hard disk while monitoring (Oscilloscope, Overall values, FFT, 1/3 octave) is performed to check data quality. The Analyser mode transforms Orchestra into a real-time frequency analyser dedicated to many industrial applications.



Expandability

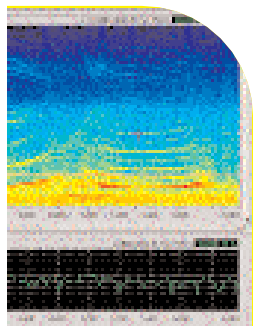
- Any combination of 4-channel input modules and function modules can be used for one measuring group
- 4 to 24 channels (max. 6 modules) per measuring group
- 8 measuring groups can be connected together via Firewire interface



Wide range of applications:

- Lab, field or mobile data acquisition
- Testing and evaluation
- Consulting and engineering services
- Predictive maintenance
- Design engineering
- Research and development
- Equipment reliability
- Education

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Measurement

- Firewire transfer rate: max. 26 Mbps
- 32 channels real time up to 20 kHz bandwidth
- Networked and distributed measurement up to 192 channels by 8 units
- Up to 100 m between each measuring group

Software

- Data recording / Throughput to disk
- Frequency Analysis (FFT / 1/n octave)
- Sound Intensity / Sound Power
- Structural Analysis
- Material Testing
- Psychoacoustics / Sound Quality
- Rotating Machine Analysis
- Predictive Maintenance

Hardware

- No main frame
- Direct connection of sensors
- Several module types
- Easy mounting of mechanical modules
- Synchronous 24 bits ADC
- Multi-frequency sampling
- >100 dB dynamic range
- Multiple tacho inputs
- High-speed Firewire interface
- AC/DC and battery powered

Example of module combination for one measuring group



Lithium-Ion battery

FireWire interface unit

Direct/ICP® module

Charge module

DC strain module

Pulse/FV module

Microphone module

Analogue output module

Technical specifications

General specifications:

- Input channels: 4 to 24 channels – 4 ch. per module – max. 6 modules can be connected
- Sampling frequencies: 3 types
 - Type 1: From 25 Hz up to 51200 Hz
 - Type 2: From 8 Hz up to 65536 Hz
 - Type 3: from 10 Hz up to 10 kHz
- Same frequency sampling type within the system
- Frequency sampling selectable per module
- Bandwidth: sampling frequency/2.56
- Transfer rate: 26.2144 Mbps
- ADC: 16 or 24 bits selectable
- Vibration resistance: MIL-STD-810C/E
- Measuring group: dimensions for 4ch. W88 x H110 x D200 mm and for 24 ch. W213 x H110 x D200 mm
- Weight: 4ch. 1.9 kg – 24ch. 4.8 kg
- Power supply: AC –110 to 240 V; DC – 11 to 30 V; Battery Pack (Optional)
- Power consumption: 18 W @ DC 12 V; 44 W @ DC 12 V

Interface unit module specifications:

- PC interface: Firewire (IEEE1394)
- Number of modules connectable: 6
- Triggers: Trigger channel – TTL, level/edge; pre/post
- Fan control mode: on/off
- Input range: from ± 0.1 to 20 Vpk
- Weighting filters: A, B, C

Direct/ICP® Input module specifications:

- Number of channels: 4 BNC connectors (Single ended) or 2 (differential)
- Coupling: AC/DC
- High-pass filter: 0.5 Hz, 20 Hz
- Low-pass filter: digital filter
- Input range: from ± 0.1 to 20 Vpk
- Weighting filters: A, B, C

Microphone Input module specifications:

- Number of channels: 4 Lemo 7 pin connectors (Single ended)
- Preamp. power and polarisation: ± 14 V and 0, 200 V
- High-pass filter: 0.5 Hz, 20 Hz
- Low-pass filter: digital filter
- Input range: ± 7 m to 7 Vpk

Charge Input module specifications:

- Number of channels: 4 Microdot connectors (Single ended)
- Charge sensitivity: 0.1 to 100 pc/m/s²
- High-pass filter: 0.5 Hz (1st order RC)
- Low-pass filter: digital filter
- Input range: 1, 3.16, 10, 31.6, 100, 316, 1000, 3160, 10000 pC

DC strain Input module specifications:

- Number of channels: 4 Lemo 6 pin connectors (differential)
- Coupling: DC
- Bridge type and voltage: full bridge, DC 2.5, 5, 10 V
- Zero adjustment: automatic
- Low-pass filter: digital filter
- Input range: from ± 0.2 to 10 mV/V

Thermocouple Input module specifications:

- Number of channels: 4 screw terminal connectors (differential)
- Thermocouple: J and K type
- Low-pass filter: digital filter
- Input range: J – from 50 to 1200°C; K – from 50 to 1300°C

Pulse/FV Input module specifications:

- Number of channels: 4 BNC connectors (Pulse) or 1 (FV)
- Input: Logic (TTL); Bipolar (AC)
- Digital input sampling frequency: from 2 to 32 MHz selectable. Accuracy: 25 ns
- Frequency measurement: from 1 to 500 kHz selectable
- Threshold: logic (from 0 to 4 V variable)

Analogue output module specifications:

- Number of channels: 4 BNC connectors (single ended)
- Output range: ± 1.2 pk (fixed) or variable at 0.1 V step with ± 5 Vpk max.

Function generator module specifications:

- Output 1ch (BNC connector)
- Peak level: 0dB (5 V), -10 dB, -20 dB
- Frequency range: DC ~ 20 kHz
- Offset range: ± 5000 mV @ 10 mV step
- THD: -70 dB or less
- Signal generated: Pink noise, white noise, sine wave, sweep sine wave

Benefits

- Acoustics and Vibration
- Process signals
- Multichannel front end
- Real-time frequency analyser
- Multi-frequency sampling
- Network capability
- Modular / expandable
- Transducer conditioning
- Many industrial applications

Orchestra software main features:

dBFA software suite is a modular solution:

- From 1 to 192 channels depending on the hardware platform
- Versatile: acoustics, vibrations, etc.
- Direct-to-disk multichannel digital signal recording with a frequency range up to 20 kHz with audio playback
- Signal, overall values and FFT – 1/3 octave spectra monitoring of several channels during recording
- Manual or automatic measurement gain settings
- Advanced trigger functions (channel, positive or negative delay, and/or conditions, etc.)
- Overload indicators with storage
- Real-time narrow band FFT analysis (from 101 to 3201 lines) of autospectra, cross-spectra, transfer functions, coherence, etc., from 0 Hz to 20 kHz, with or without zoom factor (2 to 128); linear and exponential averaging, max. hold
- Broad band analysis by digital filtering (1/1 and 1/3 octave according to Class 1 – IEC 61260). Autospectra from 1 Hz to 20 kHz
- Narrow-band (2 FFT passes – autospectra, cross-spectra, coherence) and broad-band (1/1 and 1/3 octave – autospectra) analysis of sound pressure and sound intensity (active and reactive)
- Sound power determination according to ISO 9614 parts 1 and 2
- Tachometric acquisition and calculation
- Real-time and post-processing order analysis for rotating machinery; rotation run-ups and coast-downs
- Transient analysis on pulses, shocks, etc., with or without point coordinate management.
- Time frequency analysis (FFT, 1/n octave, Wigner-Ville, Wavelets, Capon, AR)

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