SOMAT XR

Data acquisition in harsh environments

HBM

Acquire data in virtually any harsh environment

Rugged amplifier system

As the next generation of rugged mobile data acquisition systems, the powerful HBM SomatXR amplifier system was specially developed for applications in harsh environments. The rugged modules acquire a wide range of measured quantities from temperature to voltage and current. All modules are protected against moisture, dust, shock and vibrations and feature an impressively wide temperature range. It is ideal for use in mobile vehicle tests or stationary measurements under extreme conditions.

The flagship module and main processor of the product, the CX23-R, is based on a robust operating system programmed by the same expert engineers who developed the Somat product line. In case of sudden power loss, its integrated rugged memory drive secures the measured data and the system quickly recovers to continue the test job.

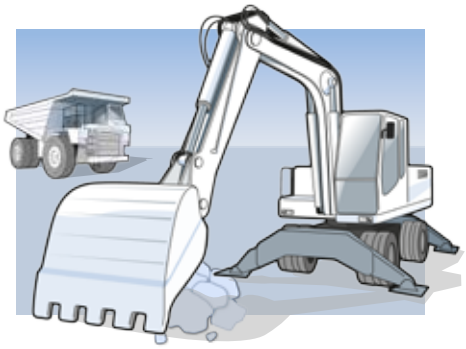
Rugged features:

- Designed to degree of protection IP65 / IP67 (dust, water)
- Extended temperature range from -40 to +80 °C
- Vibration resistant up to 10 g (MIL-STD202G, Method 204D, Test condition C)
- Shock resistant up to 75 g (MIL-STD202G, Method 213B, Test condition B)
- Robust software and data format for secure and efficient storing of measurement data

Wide-ranging applications

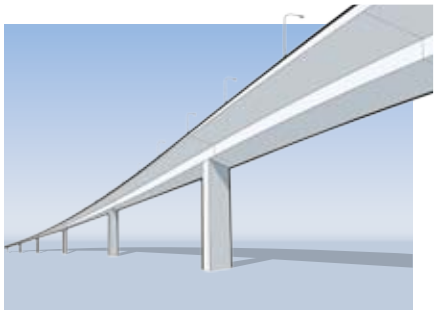
SomatXR is designed for a wide range of applications and environments where laptops and other amplifiers reach their limit and fail. Due to its rugged design and flexible system configuration, it is suited for mobile vehicle tests, structural monitoring, stationary measurements and much more.

Off-Road Equipment



Vehicle Measurement

Structural Durability Testing



The benefits at a glance:

- Backed by Somat's 40 years of testing experience in harsh environments
- Data recorder for stand-alone measurements with web-interfaces for easy remote access
- Proven signal conditioning from HBM's QuantumX family including carrier frequency
- Modular system with universal inputs to adapt to many different measurement tasks
- Precision Time Protocol version 2 (PTPv2) for a highly accurate synchronization between the different modules, which can be distributed via Ethernet over 100 m
- Sensor Data Base and dbc file upload as well as Transducer Electronic Data Sheet (TEDS) for an easy and quick test setup

View measurement data anytime and anywhere

The measurement signal is transferred from the measuring point to the CX23-R data recorder. You can sit back and monitor the test independently of the measuring point: data can be viewed and processed directly via the data recorder's **web interface without any software installation – anytime and anywhere**.

Parameterize channels, monitor measurement jobs and visualize data in just a few clicks. It communicates via standard network Ethernet technology. Wireless access to the web server is also possible via mobile devices.

Other advantages of the SomatXR web interface:

- User management with different access rights (administrator, operator, etc.)
- Multiple clients have access to one system to visualize only the data important for the corresponding users
- Running on all major operating systems for computers and tablets

SomatXR User Interface

Secure user interface with access control

SomatXR Test Configuration

Setup test configuration in a spreadsheet-like table

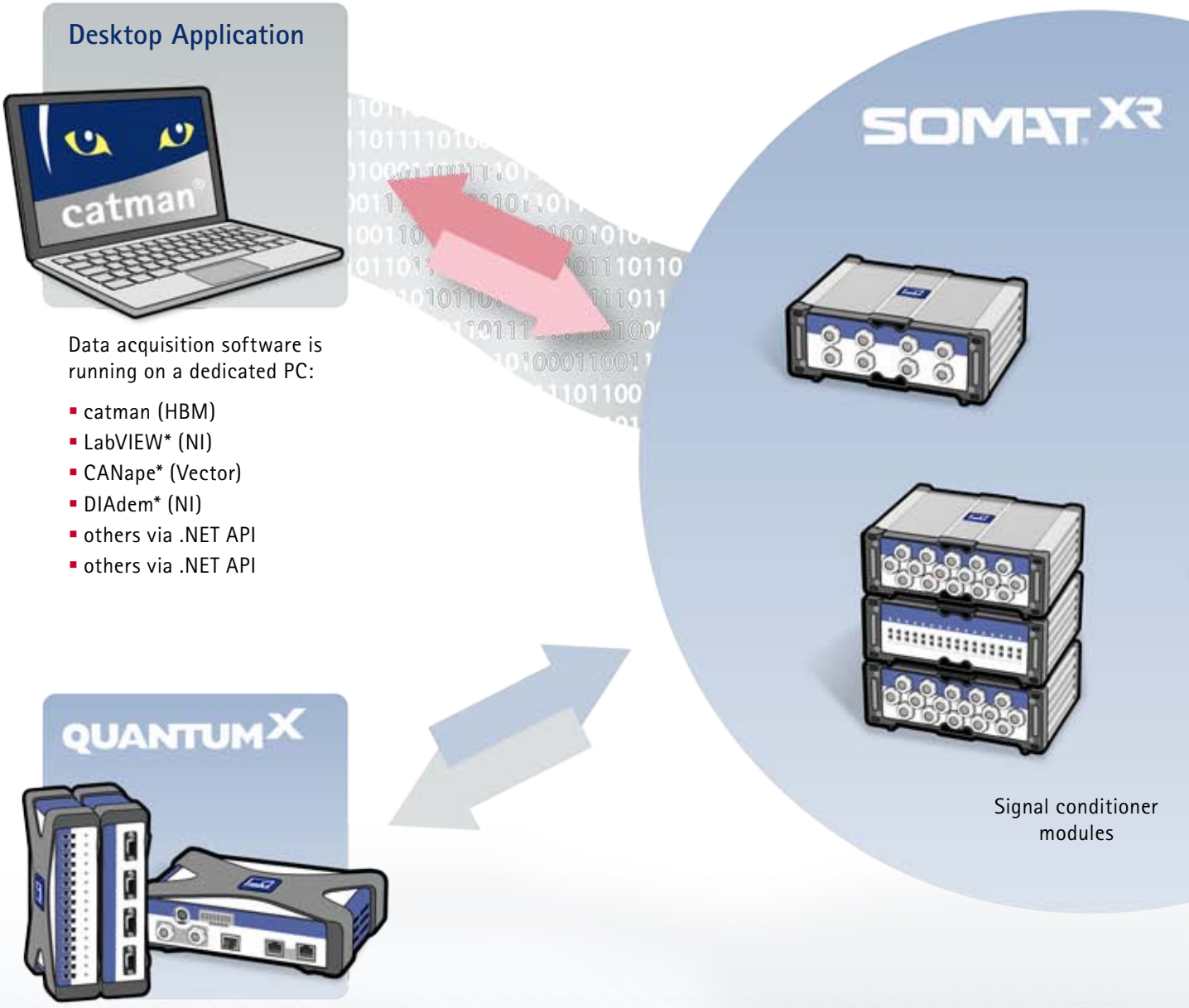
SomatXR Test Control

Easy test control and multiple visualization options

Flexible concept, consistent quality

The modular architecture of the SomatXR system allows you to implement your own measurement system – with a data recorder and web interface or even with a connected PC and HBM catman measurement software. In addition, SomatXR modules can be integrated in the universal QuantumX amplifier system for test stand applications.

In just a few simple steps you can put together a highly individualized data acquisition system scaled to your specific needs. Ethernet TCP/IP IEEE 1588 (PTPv2 synchronization) is available as a communication interface.



Data acquisition software is running on a dedicated PC:

- catman (HBM)
- LabVIEW* (NI)
- CANape* (Vector)
- DIAdem* (NI)
- others via .NET API
- others via .NET API

Signal conditioner modules

Compact and universal DAQ

* LabVIEW and DIAdem are registered trademarks of National Instruments Corporation.
* CANape is a registered trademark of Vector Informatik GmbH.
* .NET is a registered trademark of Microsoft Corporation.

Synchronous

Ethernet PTPv2,
FireWire,
NTP, IRIG-B

Scalable

1 to 10,000 channels

1 — 10,000

Real-time

Real-time modules,
analog outputs,
EtherCAT

CX23-R

Data Recorder

Web Application

Data acquisition software is running on the recorder. Access recorder via the browser of any device without any installation.

SOMAT eDAQ and eDAQlite

Rugged and centralized DAQ

SOMAT CR

Rugged thermocouple module

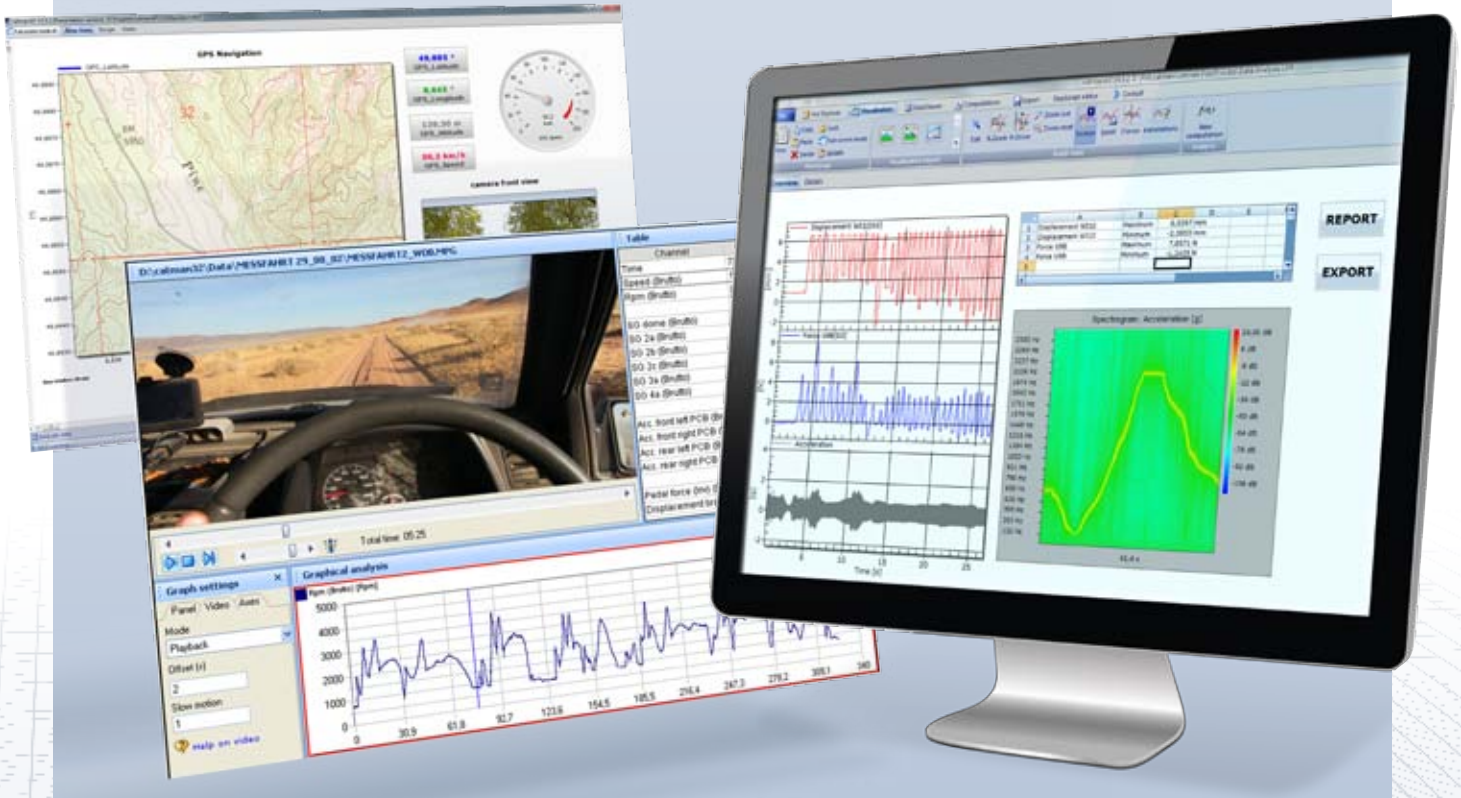
Analysis software

catman® PostProcess

Would you like to analyze your measurement data and strengthen the reliability of your measurement results? catman PostProcess software simplifies the acquisition, visualization and analysis of your measurement data. With its intuitive interface and adaptability, catman software will help you streamline your measurement projects.

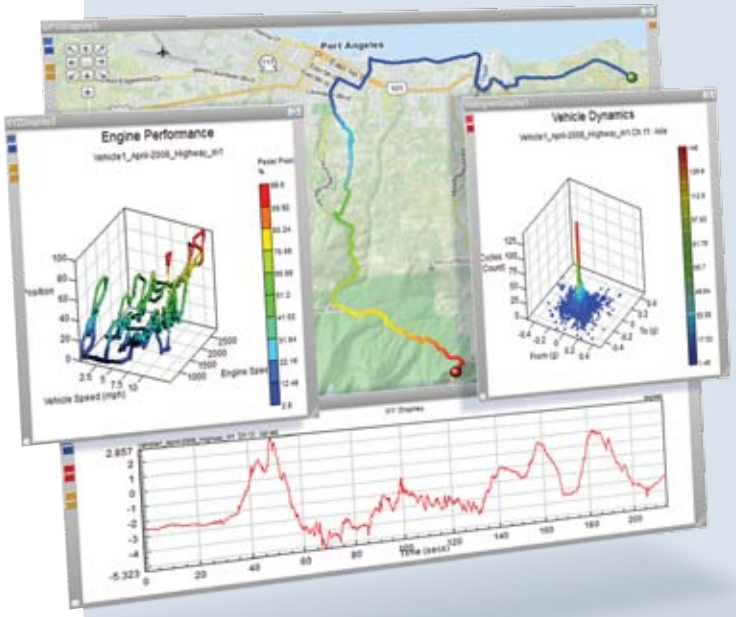
Features:

- Graphical data visualization in time, frequency or angle domain
- Individual visualizations and operator controls over several panels
- Data cleansing and preparation using curve operations
- Statistics: Min, Max, Mean, RMS, ...
- Video-based data analysis
- Powerful math libraries: standard math and application specific functions (e.g. rosette and power calculations)
- Export data in various formats (Microsoft® Excel, ASCII, MDF3/4, National Instruments DIAdem, MathWorks MATLAB, RPCIII, UFF58, ...)
- Report creation (Direct or using Microsoft® Word, Excel)



nCode GlyphWorks®

nCode GlyphWorks is a powerful data processing software used for analyzing engineering test data, with specialized capabilities in durability and fatigue analysis. Intrinsically multi-file, multi-channel, and multi-format, nCode GlyphWorks is optimized to handle massive and complex data efficiently while providing an intuitive graphical environment that enables users to go from raw data to results quickly and easily.



Features:

- Standardized analysis processes for setting high and low pass filters, position and time-based resampling, and calculating derived channels
- Applies world-class durability and fatigue concepts for damage accumulation and test profile generation
- Integration with nCode DesignLife to improve data correlation between test and CAE
- Complete range of tools for analysis in the time, frequency, and statistical domains
- Synchronized GPS and video displays
- Scripting capabilities to extend functionality using MATLAB® or Python programming language
- Fatigue materials database to calculate fatigue life from measured data to determine stress-life, strain life, crack growth, and creep analysis
- Optimized testing module to determine the most efficient mix of events required to match an overall target

INFIELD

Field Performance and Analysis Software

InField is a versatile field analysis software designed to enhance the field test collection and data visualization for SomatXR hardware. It has been developed with easy to use plotting capabilities for test and design engineers to ensure good field data and to make tough design decisions prior to leaving the test site.

Features:

- Plotting in time or frequency domain
- Statistics to identify key test values as Max, Min, Standard Deviation, RMS, Mean, etc.
- Calculator to perform mathematical functions
- Frequency Analysis to perform FFT, Inverse FFT, and FRF analysis on the time domain data
- Rosette Analysis module to convert rosette strain gauge data

SomatXR: The flexible system solution

CX23-R

Data recorder

Interfaces

- 1x DIO (3 inputs, 2 outputs)
- 1x GPS
- 3x CAN
- 2x Ethernet
- 1x Ethernet host
- 1x USB
- 1x AUX (eDAQ sync)

Special features

16 or 64 GB internal memory

Web interface

Somat DataModes

Computed channels

Stand-alone data acquisition

EX23-R

Ethernet switch

Interfaces

- 5 Gigabit Ethernet ports
- 5 Gigabit Ethernet ports with "Power over Ethernet" (PoE)

Special features

PTPv2 support (Precision Time Protocol IEEE 1588)

Power supply for wireless access points or cameras via PoE

MX1601B-R

High level amplifier

Transducer technologies

- Voltage (±100 mV, ±10 V, ±60V)
- Current (0 to 20 mA)
- Current-fed piezoelectric transducer (IEPE / ICP®)

Special features

Channels: 16

Sampling rate per channel: 20 kS/s

Signal bandwidth: 3 kHz

Sensor supply ch 1-8: 5...24 V, 0.7 W (module 2 W)

Sensor supply ch 9-16: V_{IN}-1V, 30 mA (module 75 mA)

MX1609KB-R

Thermocouple amplifier

Transducer technologies

- Thermocouples Type K

Special features

Channels: 16

Sampling rate per channel: 600 S/s

Signal bandwidth: 15 kHz

MX1615B-R

Bridge amplifier

Transducer technologies

- Strain gauge full bridge circuit
- Strain gauge half bridge circuit
- Strain gauge quarter bridge circuit with integrated 120 and 350 Ohm completion resistors
- Voltage (±60 V)
- Ohmic resistor
- Potentiometer
- Resistance thermometer PT100

Special features

Channels: 16

Sampling rate per channel: 20 kS/s

Signal bandwidth: 3 kHz

Bridge excitation: DC or CF (1,200 Hz)

Internal shunt resistor: 100 kOhm

MX411B-R

Highly dynamic amplifier

Transducer technologies

- Strain gauge full bridge circuit
- Strain gauge half bridge circuit
- Current-fed piezoelectric transducers (IEPE/ICP®)
- Piezo-resistive full bridge circuit
- Inductive half or full bridge circuit, LVDT
- Voltage (±10 V)
- Current (0 to 20 mA)

Special features

Channels: 4

Sampling rate per channel: 100 kS/s (2ch: 200 kS/s)

Signal bandwidth: 40 kHz

Real time: RMS, Peak

Sensor supply: 5...24 V, 0.7 W (module 2 W)

Internal shunt resistor: 100 kOhm

MX471B-R

CAN module

Interfaces

- CAN 2.0 A/B (ISO 11898, send/receive) CCP, XCP-on-CAN receive

Special features

Channels: 4

Internal bus termination

Configurable bit rate

MX assistant can generate a DBC file

Signal acquisition per channel: 128

Transmit measurement signals: 200

MX840B-R

Universal amplifier

Transducer technologies

- Strain gauge half or full bridge circuit
- Current-fed piezoelectric transducers (IEPE/ICP®)
- Piezo-resistive full bridge circuit
- Resistance thermometers (PT100, PT1000)
- Thermocouples (types K, N, R, S, T, B, E, J, C)
- Ohmic resistor
- Potentiometric consumers
- Inductive half or full bridge circuit, LVDT
- Voltage (±100 mV, ±10 and ±60 V)
- Current (0 to 20 mA)
- Channel 5-8, in addition: Frequency, counter, incremental rotary encoder (incremental with/without index), SSI
- Channel 1, in addition: High speed CAN (ISO 11898, read 128 signals, transmit 7 channels)

Special features

Channels: 8

Sampling rate per channel: 40 kS/s

Signal bandwidth: 7 kHz

Sensor supply: 5...24 V, 0.7 W (module 2 W)

Internal shunt resistor 100 kOhm

Bridge excitation: DC or CF (4,800 Hz)

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