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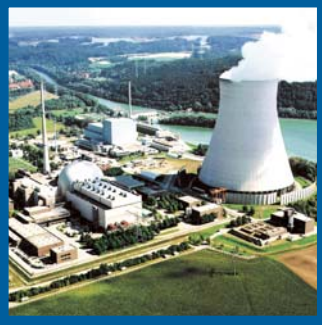
Coda

Continuous Data Acquisition, Signal Analysis and Process Monitoring





Coda

Coda (Continuous data acquisition) is a full-featured turnkey software platform for data acquisition, signal analysis and process monitoring. Complete turnkey operation provides quicker time to test by eliminating costly application programming and long learning curves. The extensive built-in features and tools offer a functionality that was previously available only in custom packages. The intuitive GUI facilitates set-up, operation and analysis, thus leading to precise, repeatable results quickly.

Turbomachinery test facility at Siemens, Duisburg/Germany

Extensive Application Coverage

Thanks to its modular structure and easy parameterization, Coda is the perfect solution for a wide range of applications:

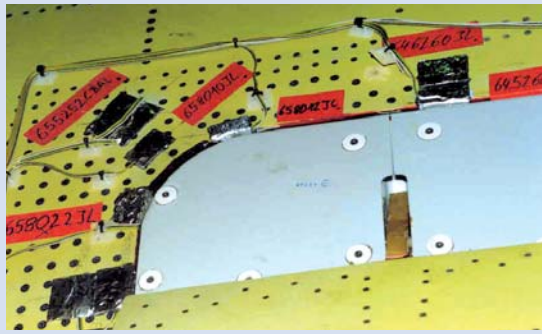
- Measurements and data analysis on test stands and test assemblies.
- Performance and functional tests of turbo-compressors, gas and steam turbines, jet engines, rocket engines, gearboxes, generators.
- Experimental structural testing, multi-axis strain and stress analyses.
- Process monitoring in power plants, in refineries, at production lines.


Continuous data acquisition and analysis

Coda processes virtually every physical quantity, for example, temperatures, voltages, stresses, strains, pressures, forces, accelerations and frequencies. Even high-channel count applications using thousands of channels can be configured within a very short time and are handled safely and efficiently.

Static and dynamic structural tests, e.g. on aircraft or rail vehicles, are a specialty of Coda. Features include measurements with single-and multi-channel strain gauges, real-time strain and stress calculations, limit checking and communication with the load control system.

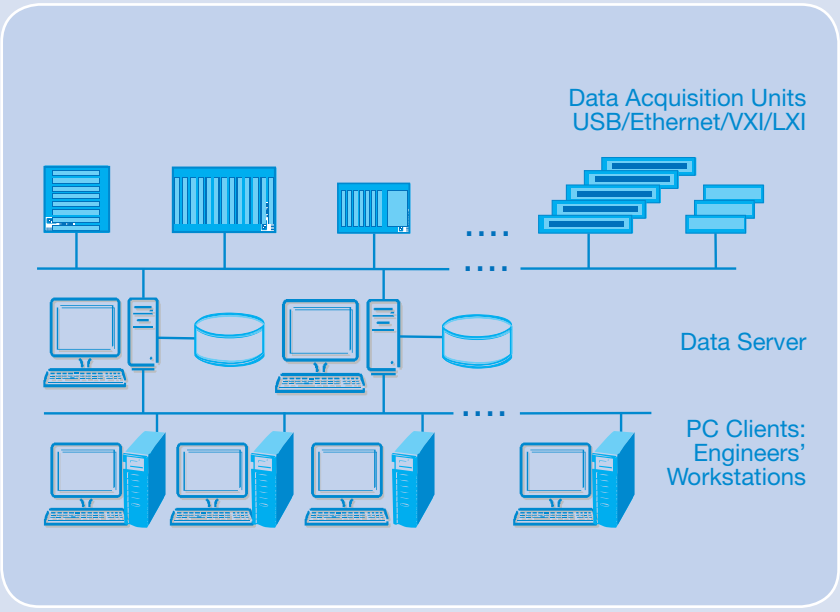
Strain gauge measurements



Flexible System Architecture

The powerful client/server architecture allows shared use of acquired data, enabling several test engineers to have concurrent online access for data display and analysis operations.

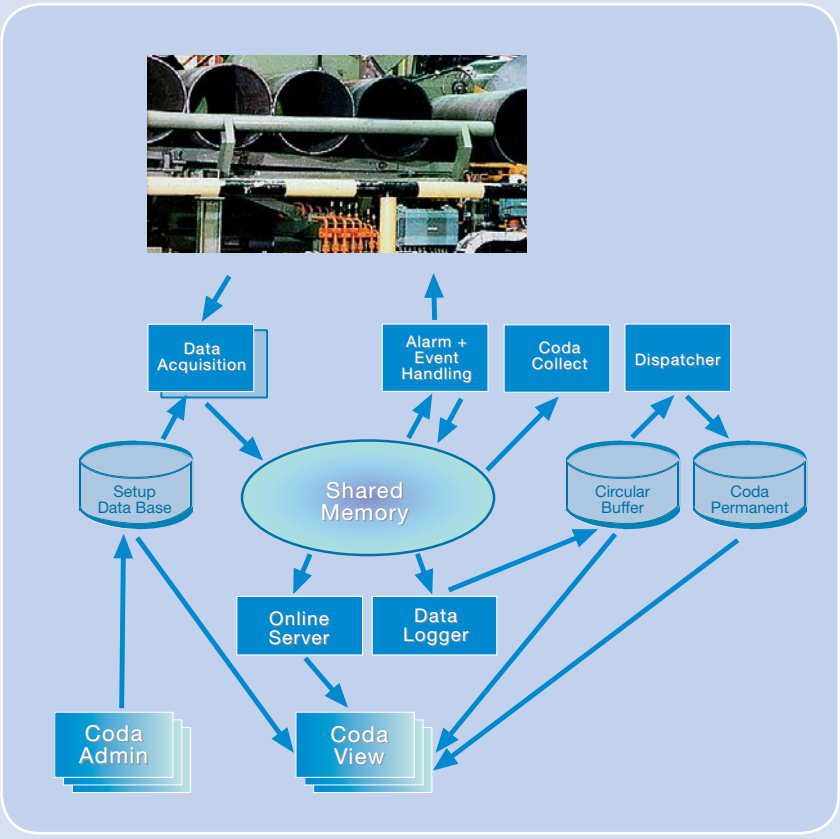
As standard, Coda supports a variety of USB, Ethernet, LXIbus and VXIbus-based instruments covering a wide range of measurement tasks in industry and in the laboratory. These instruments are renowned for their high performance, measurement accuracy and reliability. Special acquisition hardware can be easily integrated and Coda also communicates with subordinate process computers for data transfer.



Powerful Data Management

Coda stores and processes the acquired data in its uniform data model. Even different sampling rates for data groups or data acquired in an asynchronous way are permitted. As a rule, Coda stores the measured raw data to ensure access to the original data at any time.

Extensive built-in features ensure the economy and efficiency of every Coda project. These key features include client/server architecture, SQL data base for parameter management, automatic instrument identification, real-time mathematical functions, real-time alarm monitoring and limit checking for every channel, sophisticated data display, comprehensive visualization, data replay and data export into common file formats.

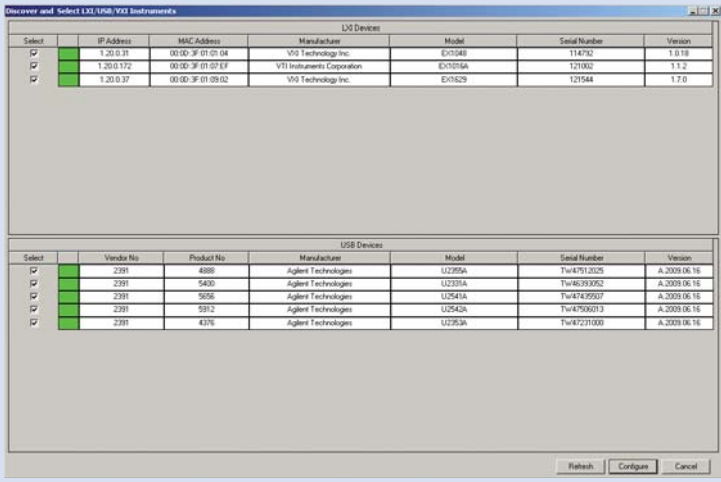


Main Software Modules

CodaAdmin

CodaAdmin is the core module of the Coda software system. It provides access to many of the key features such as:

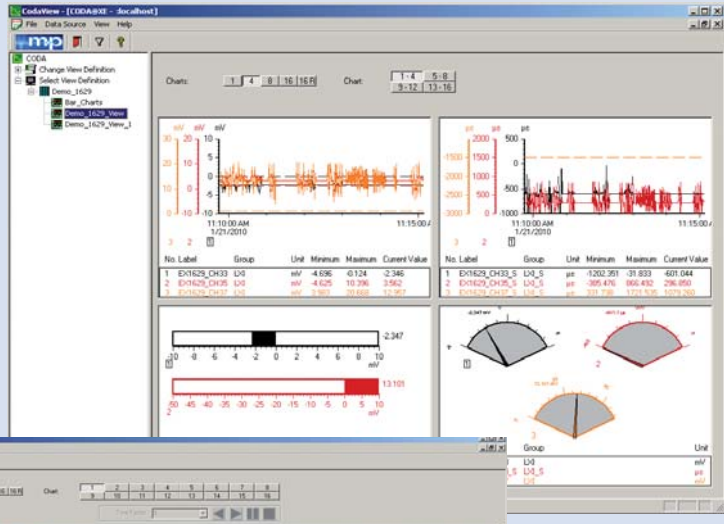
- Automatic instrument identification
- Configuration of measurement hardware
- Administration of Coda system
- Definition of test runs
- Start/stop of test runs
- Hardware calibration, etc.

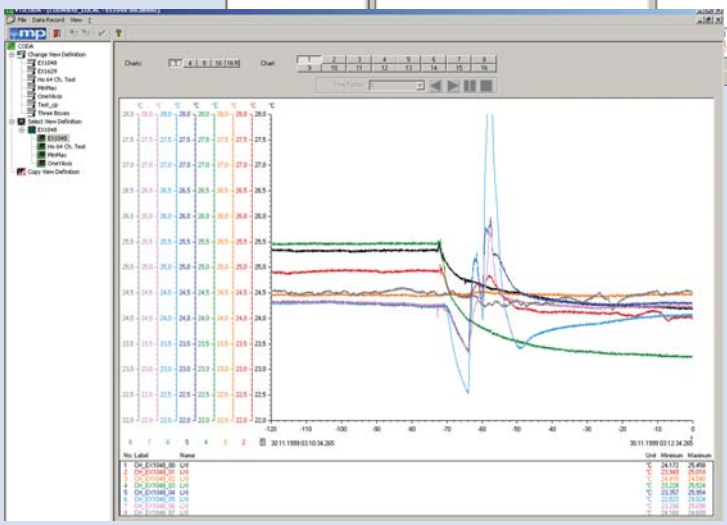


CodaView

CodaView is used to display the channels in a multitude of ways:

- Individual graphical interfaces
- y/t or y/x diagram, bar chart, tachometer, waterfall, FFT, PSD, digital numbers
- Marker, zoom functions, etc.
- Up to 64 traces per diagram
- Data replay

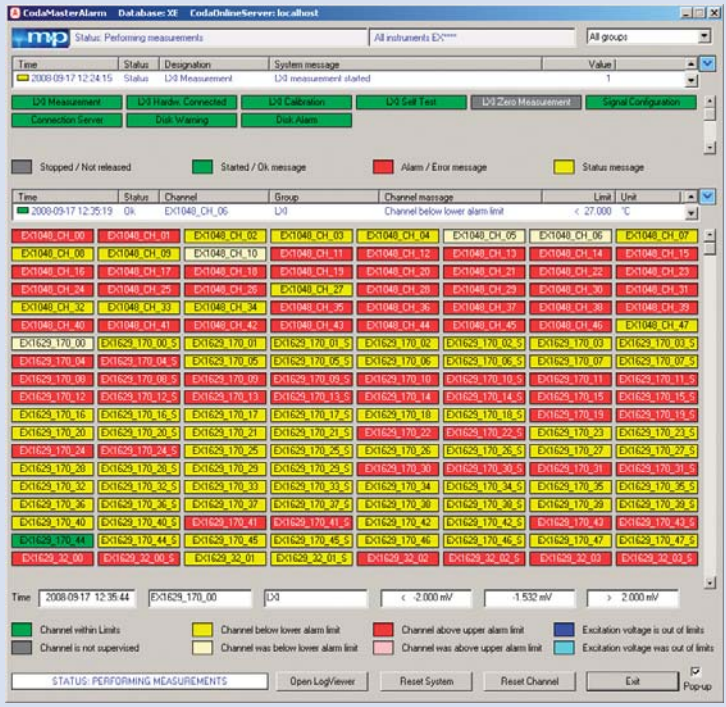




CodaAlarm

CodaAlarm provides an overview of all active channels and their current status with regard to alarm limit violations:

- Alarm monitoring for general system components and for every channel
- Alarm events are entered into the log file
- Clearly arranged window allowing the user to see the current status at a glance



CodaCollect

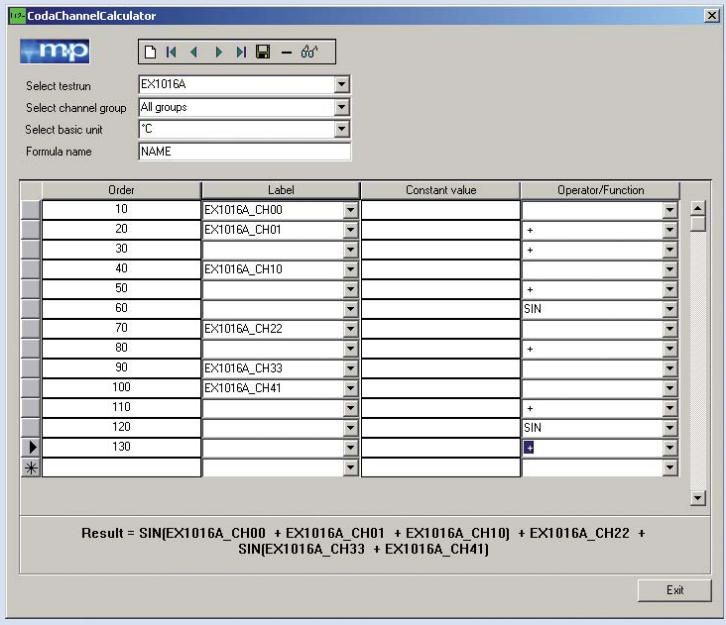
CodaCollect allows the user to take snapshots of the data in digital form to store and output important data:

- Snapshots of all measurement data or of a filtered group of data
- Unlimited number of snapshots per test run
- Manual/triggered
- Analysis in Excel spreadsheets

CodaChannelCalculator

CodaChannelCalculator is used to calculate virtual channels online:

- Calculated channels are treated like the measured channels for analysis and reporting
- Easy creation and combination of formulas based on “Reverse Polish Notation” (RPN)
- Large number of operators available such as +, -, *, /, SIN, COS, TAN, ABS, SQR, ^2, ^3



Key Features

- **Scalable System for Thousands of Channels**

The scalable architecture of Coda makes this package ideal for any test size, from tens to thousands of channels. High-channel count systems can be easily configured and are ready to test within a very short time.

- **Client/Server System**

The client/server architecture allows several test engineers to have concurrent online access to the acquired data for display and analysis operations. The online server approach also ensures reliable data archival and retrieval with integrated error diagnostics to guard against connection and data access issues.

- **Intuitive Graphical User Interface**

Coda runs in the familiar Microsoft Windows environment which means minimum operator training and easy, fast set-up, operation and analysis, thus leading to high-quality results quickly. All instruments are configured within one GUI.

- **Database-Supported Management**

All Coda configuration data are stored in a central SQL database for maximum flexibility and repeatability.

- **Automatic Instrument Identification**

By a simple mouse-click, Coda is able to identify the connected measurement hardware and also the number of connected channels.

- **Measurement Functions**

Coda supports ¼-, ½- and full-bridge configurations, rosette type sensors, standard thermocouple types (J, K, T, E, S, R, B, N, and user-definable) as well as voltage and current transducers. During the test run the relative zero point (or reference) of all or selected channels can be acquired at any time.

- **Channel Grouping**

Acquired data and computed channels can be freely combined in user-definable groups for subsequent analyses.

- **Data Storage**

Powerful storage functions allow for comprehensive data management and temporary or permanent, pre-programmed or event-controlled data storage for all or selected channel groups.

- **Real-Time Alarm Monitoring**

Coda provides a full-featured limit checking and alarm monitoring capability for all active channels. Out-of-limit data is displayed in a separate window and logged.

- **Comprehensive Visualization**

As with the online data analysis, the measured values can be graphically displayed in a y/t- or y/x-diagram, as bar chart, tachometer, waterfall, FFT, PSD or digital numbers by a simple mouse-click. Coda allows the user to freely design individual graphical interfaces for real-time measurement and visualization.

- **Replay Function**

This function allows to review events without affecting the live acquisition process. Adjustable forward/reverse and speed make replay easy. All graphical online functions are available during the data replay.

- **Sophisticated Analysis and Reporting**

Convenient analysis tools are included for viewing measured data. The ultimate step is using the SO Analyzer e-Reporter software from m+p international. It provides test engineers with powerful tools for the most demanding analysis and reporting tasks.

Advanced analysis of Coda data using m+p international's SO Analyzer

- **Standardized Data Interfaces**

Coda has standardized data interfaces which enable easy integration of different measurement devices, acquisition of data coming from process control systems (e. g. via LAN, FireWire, etc.) and synchronization of various data sources.

- **Data Export**

The formatted data of selected or all channels can be easily exported into Excel, ASCII, MATLAB, m+p international's SO Analyzer or other popular analysis packages.

Acquisition Hardware

For highest system flexibility Coda supports a wide variety of powerful USB, Ethernet, LXIbus and VXIbus-based instruments from renowned manufacturers. Thus the user can select his preferred acquisition hardware for any test size. Other or existing measurement devices can be easily integrated.

VibRunner

VibRunner is m+p international's modular acquisition hardware for applications from 24 input channels (single-ended/ fully differential). It is designed for the flexibility of functioning as a standalone or rack-mount unit. To extend input channel capability two or more VibRunner systems can be synchronized. Equipped with 24-bit sigma-delta A/D converters with up to 102.4 kHz sampling rate VibRunner allows for alias protected measurements in a frequency range up to 40 kHz and more than 120 dB spurious-free dynamic range. VibRunner provides 1 Gbit/s Ethernet connectivity to a host PC or a laptop.

VibPilot

Compact and portable, the 4- or 8-channel VibPilot is the perfect device for precise measurements indoors and outdoors. It provides 24-bit resolution, high-speed USB interfacing and sample frequencies from 1024 Hz to 102.4 kHz. VibPilot and VibRunner both support m+p international's SO Analyzer software: All Coda test results can be directly exported to the SO Analyzer software for even more advanced analysis and reporting functionality.

LXIbus Hardware

Coda supports the advanced 48-channel EX1000 family of data acquisition instruments for thermocouple and voltage measurements (also in combination with the EX 10SC signal conditioning expansion chassis) and the 48-channel EX1629 strain gauge instrument. These highly accurate LXI-based instruments made by VTI Instruments Corp. are scalable from tens to thousands of channels.

VXIbus Hardware

For many high-channel count applications the proven VXIbus hardware is the ideal solution because of its performance, accuracy and reliability. Coda supports VT1413, VT1415, VT1419, VT1422 and E1459 instruments.

USB-Based Hardware

The U series data acquisition hardware from Agilent Technologies gives the user the choice and flexibility to create solutions that evolve and expand to his changing measurement needs. The series provides USB 2.0 connectivity and includes multifunction measurement modules, simultaneous-sampling measurement modules and digital input/output (I/O) modules. These versatile, compact modules can be used standalone or plugged into a chassis.

Etherned-Based Hardware

The compact and rugged, Ethernet-based I/O chassis from United Electronic Industries are compatible with a wide variety of I/O boards for voltage input, current input, thermocouples, strain gauges, RVDT/ LVDT, digital I/O, counter etc. The boards can be installed in any combination to perfectly meet the test requirements.

Coda Specifications

Hardware Support
- m+p VibRunner
- m+p VibPilot
- VTI Instruments EX1629, EX1000A/16A/32A/48A, Bustec 6100 (LXIbus)
- VTI Instruments VT1413, VT1415, VT1419, VT1422, Agilent E1459, Bustec 3150-AA (VXIbus)
- Agilent U2100, U2300, U2500, U2600, U2802 series
- United Electronic Industries cube I/O chassis
- Other hardware support on request
- Multiple client/server system configuration

Measurement Setup
- Automatic instrument identification
- User authorisation management
- Catalogues for measurement dimension, engineering units, material properties
- User-definable channel groups
- Save/recall and copying of setups
- Export/import setups
- Signal configuration with copy function and entry check
- Alarm monitoring (user-defined) for general alarms and per channel
- Shunt calibration and verification
- Temperature balancing
- Predicted limits
- Calculated channels
- Real-time strain and stress calculations
- Rosette type sensors

Measurement Functions
- Manual start/stop of measurement
- Triggered start/stop
- Automatic zero setting
- Acquisition of relative zero points during test run
- Pre- and post-trigger for events

Visualization Functions
- Preparing individual view definitions, copying of view
- Digital/tabular displays
- Time history with marker and zoom functions
- y/t and x/y graph with marker and zoom functions
- Bar graph
- Tachometer
- Waterfall
- FFT
- PSD
- Lin/log representation
- Up to 64 traces in one diagram
- Up to 16 diagrams per window
- Several windows
- Channel selection and changing in diagrams
- Data export for further analysis
- Log viewer
- Save and recall data
- Multi-workstation function
- Data replay, adjustable speed

Options
- Sophisticated analysis with SO Analyzer e-Reporter
- Snapshots in MS Excel
- Circular buffer
- FFT computation/display

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