CoCo-80X

TOUCHSCREEN DYNAMIC SIGNAL ANALYZER

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Portable
- 2 to 8 inputs each with IEPE
- Battery powered

Fast and Accurate
- Patented dual-AD technology
- 150 dBFS input dynamic range
- 20 Volt input range
- 102.4 kHz sampling
- Full speed recording

Powerful Interfaces
- CAN-Bus, USB, HDMI, GPS, Audio and Wi-Fi*
- Large touchscreen with vivid color display
- SD card for mass data storage
- Hard keys for quick access

Non Wi-Fi and Non GPS options are available

CoCo-80X
DYNAMIC SIGNAL ANALYZER
VIBRATION DATA COLLECTOR

The CoCo-80X is a new generation of handheld data recorder, dynamic signal analyzer and vibration data collector from Crystal Instruments. Building on the success of the original CoCo-80, the new CoCo-80X boasts improved speed, a bigger screen, and more connection options. A significantly more powerful processor frees DSP resources for faster, more reliable, and more complex processing in real-time.

The handheld system is equipped with a bright 7.0 inch color LCD display with multi-point touch functionality as well as a physical keypad. Flexible connections via a USB 2.0 port, 100Base-T Ethernet port, 802.11 b/g/n optional Wi-Fi connection, SD card interface, HDMI interface, CAN-bus/serial port, stereo headphone and microphone jack, and GPS. Connect the CoCo-80X to a PC to download files, remotely control operations, or upgrade the software through several means of network connections.

The CoCo-80X is equipped with 8 software-enabled input channels. A unit initially purchased as a 2 channel CoCo-80X can be remotely upgrade to 4, 6, or 8 channels via purchased upgrade. Each analog input is serviced by two 24-bit ADCs and a DSP implementing the cross-path calibration technology of US Patent number 7,302,354 B2 to achieve better than 150 dBFS dynamic range. Measured time histories can be recorded in 32-bit single precision floating point format and all subsequent signal processing is performed using floating-point arithmetic. 54 sample rates from 0.48 Hz to 102.4 kHz are provided with better than 150 dB of alias-free data.

The (ISO 11898-1&2) CAN-bus digital input allows simultaneous measurement of an automobile's speed, engine RPM and/or any of the hundreds of performance variables tracked by its Controlled Area Network (CAN). An embedded signal source channel provides several standard waveforms that are synchronized with the input sampling rate. A tachometer channel can be enabled to measure the rotating speed during data acquisition.

BENEFITS

- Ultra-portable for field or lab use
- Data recording and real time measurement all available in one box
- High definition recording with extreme accuracy
- Speeds time from data acquisition to analysis
- Super high dynamic range eliminates the need of input range setting
- Dual user interface for both lab user and field route data collection

APPLICATIONS

- Route vibration data collection
- Modal Testing
- Order Tracking
- Spectrum Analysis
- Waveform Recording
- In-Vehicle Data Acquisition
- Rotating Machinery Analysis
- Transient Capture and SRS
- Waterfalls & Spectrograms
- Real-time Octave Analysis
- Machine monitoring

The CoCo-80X hardware platform supports three different software working modes: Dynamic Signal Analyzer (DSA), Vibration Data Collector (VDC), and CoCo Real-Time (CRT) mode. Each working mode has its own user interface and navigation structure. DSA mode is designed for structure analysis and mechanical testing. It is useful for electrical measurement, acoustic analysis, and a wide range of other applications. VDC mode is dedicated to route-based machine condition monitoring, vibration data collection, and trending. CRT mode allows the instrument to be operated as a bench-top testing device where commands are executed and data is displayed in real-time on an accompanying PC.
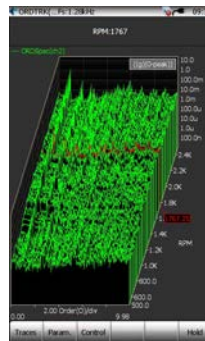
The CoCo-80X supports multiple languages that can be switched dynamically. It comes with English, Chinese, Japanese, French and Spanish.

The CoCo-90 is separate model that mainly targets at general data acquisition. It is equipped with 16 input channels employing LEMO connectors.
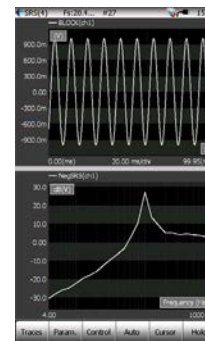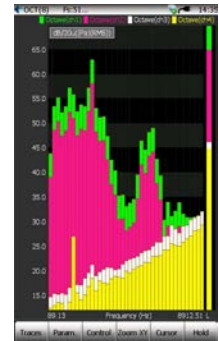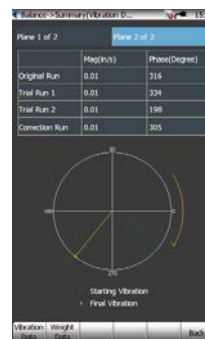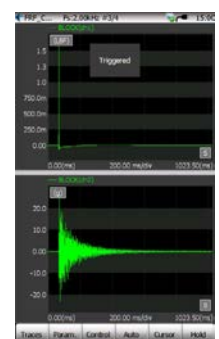
DYNAMIC SIGNAL ANALYZER
Software Features Sample

Order Tracking

Shock Response Spectrum

Octave Analysis

Rotor Balancing

Vibration Intensity

Modal Data Acquisition

CoCo-80X FEATURES

Analog Input

Signal Conditioning → Amplifier Gain = A / Amplifier Gain = B → A/D Converter / A/D Converter → DSP → Digital Output
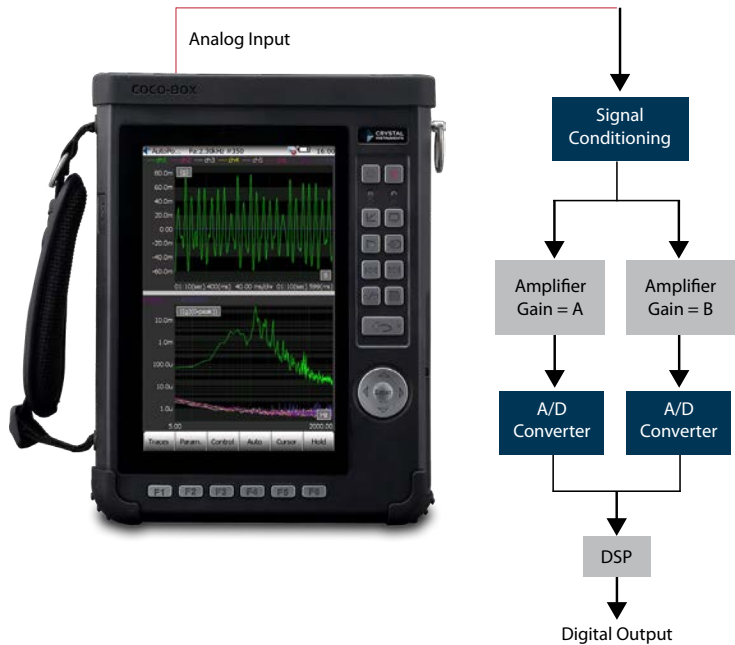
High Dynamic Range

Crystal Instruments achieves its very high dynamic range for all its measurement instruments by using a unique patented technology that uses two A/D converters in each measurement channel.

With such high dynamic range of each input, the gain settings (voltage range settings) are very much eliminated.
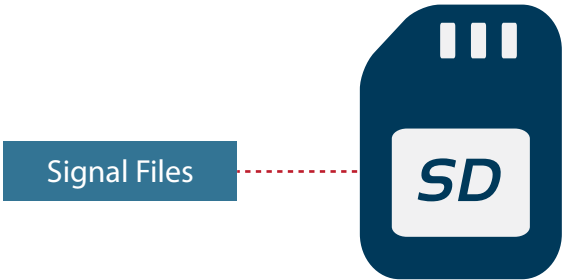
Wi-Fi Connection to PC*

CoCo-80X is wireless equipped. It can connect to the LAN or Internet via Wi-Fi to transfer the data or control signals.

Non Wi-Fi and Non GPS options are also available

Convenient SD Card

Users can copy recorded signal files from the internal flash memory to an SD memory card or directly record the time stream data to an SD memory card.

Signal Files

CAN-Bus
The (ISO 11898-1&2) CAN-bus digital input allows simultaneous measurement of an automobile's speed, engine RPM and/ or any of the hundreds of performance variables tracked by its Controlled Area Network (CAN).

This diagram on the right illustrates how the CAN-bus works with the CoCo-80X. Users need to configure the CAN-bus profile on EDM, upload the profile to the CoCo-80X, and initiate the operation of CAN-bus.
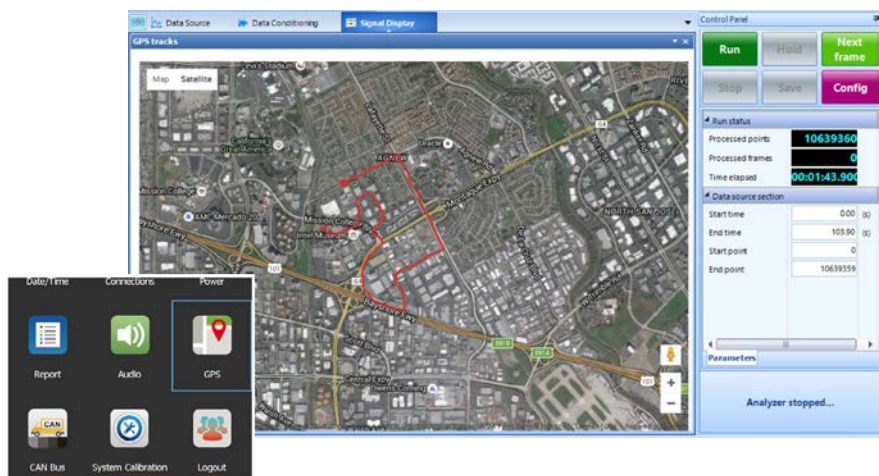

High Resolution Display (HDMI)
Signals from the CoCo-80X are displayed on a high-resolution monitor or television with the simple connection of an HDMI cable. Set-up is easy and simple.
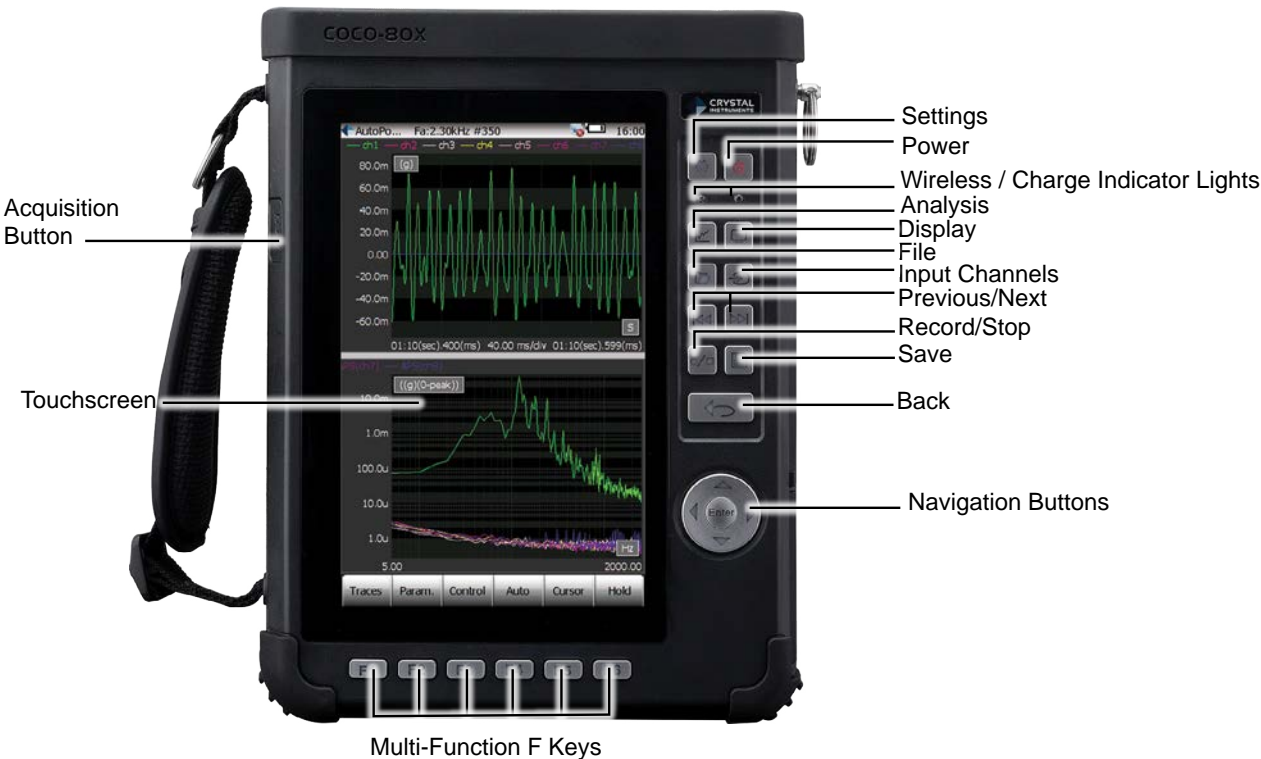

GPS Feature Included
Record all location data automatically during signal recording. Users are also able to view live location data through the easy-to-use GPS feature.

CoCo-80X HARDWARE DIAGRAM

Acquisition Button

Touchscreen

Multi-Function F Keys

Settings
Power
Wireless / Charge Indicator Lights
Analysis
Display
File
Input Channels
Previous/Next
Record/Stop
Save

Back

Navigation Buttons

Ground

Tacho/ Output Channel

8 Input Channels

GPS Antenna

CAN/Serial

Ethernet

Audio In/Out

Mini HDMI

Mini USB

SD Card Slot

Reset Button

The CoCo-80X is software configurable with 2, 4, or 8 channels. The CoCo-90 features 16 channels in the same form factor as the CoCo-80.

8 channel configuration of CoCo-80X

16 channel configuration of CoCo-90

CoCo PRODUCT SPECIFICATIONS

CoCo-80X

The CoCo-80X is equipped with 2, 4, or 8 software configurable input channels through BNC connectors. The removable SD card can record 8 channels of streaming signals simultaneously (up to 102.4 kHz) while computing real-time time and frequency based functions. An embedded signal source channel provides various signal output waveforms that are synchronized with the input sampling rate.

Inputs: 2, 4, 6, 8 channels
Up to 8 BNC connectors, built-in IEPE current source, single-ended or differential, AC, DC coupling, 150 dBFS dynamic range, dual 24-bit A/D converters, input range ±20 Volts

Output
1 LEMO connector, 100 dB dynamic range, 24-bit A/D converter

Tacho
1 LEMO connector: Tachometer Type 1 and 2 share one LEMO connector and can be selected by the software.

Interface Ports
100 Base-T Ethernet, Wi-Fi, GPS, Mini-USB 2.0, SD Card, Audio input and output, CAN-bus

Maximum Sampling Rate
102.4 kHz simultaneously for all inputs

LCD
7"color TFT WVGA display 800x480 resolution with P-Cap touch screen, 1300 NITS

Dimensions
229 x 172 x 65.5 mm (L X W X H)

Weight
1.96 kg including battery

Power
Power Input: DC power 15 V (±10%)/3A
Max Power Consumption: 14 watts, 8 watts with LCD off
Battery Operations: 6-8 hours

Typical Real-time Analysis Functions
Math (+,-,*, /), integration, differentiation, FFT, averaging, windowing, auto power spectra, cross spectra, FRF, coherence, real-time filters, RMS, octave, order tracking, swept sine, limiting, alarm/abort and more.

Vibration Data Collection Functions
RMS, true-RMS, overall-RMS, waveforms, spectrum, demodulated spectrum, trending and alarm, 2 plane balancing. Measure acceleration, velocity, displacement and tachometer.

CoCo-90

The CoCo-90 is equipped with 16 input channels employing LEMO connectors. It can accurately measure and record both dynamic and static signals. The mass flash m emory c an r ecord 1 6 channels of streaming signals simultaneously (up to 51.2 kHz) while computing real-time time and frequency based functions. An embedded signal source channel provides various signal output waveforms that are synchronized with the input sampling rate. LEMO to BNC adapters are provided.

Inputs of CoCo-90
16 LEMO connectors, built-in IEPE current source, single-ended, AC or DC coupling, 100 dB dynamic range, 24-bit A/D converters, input range ±10 Volts
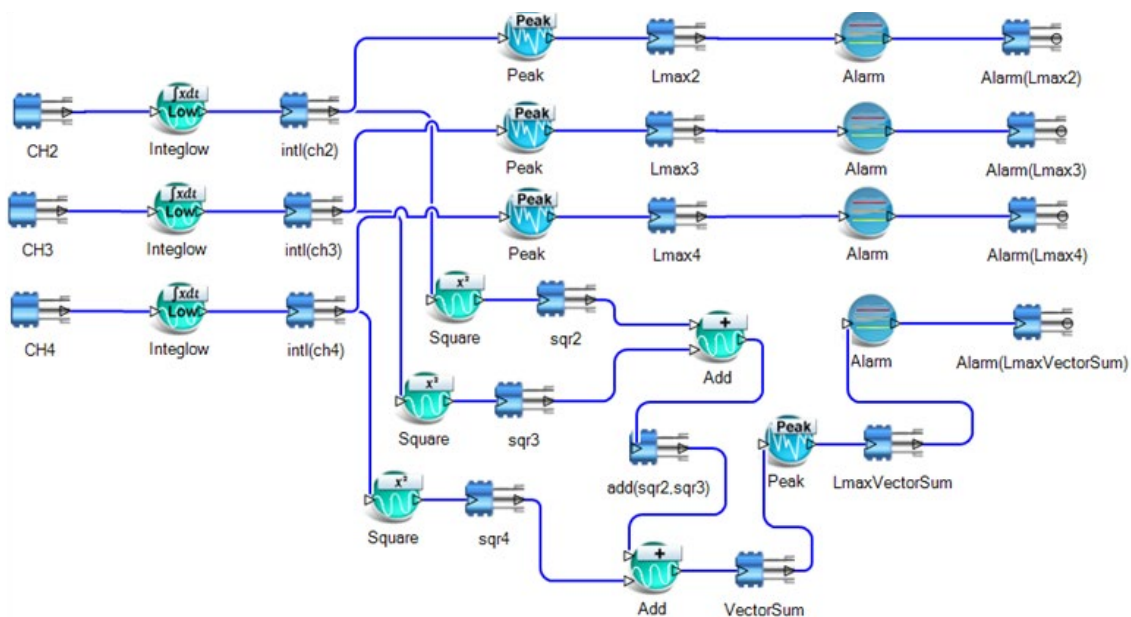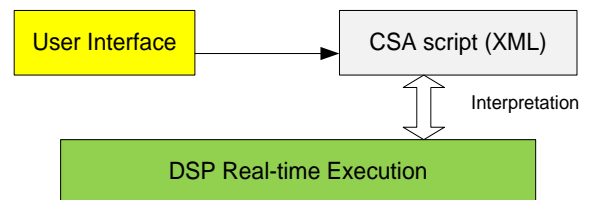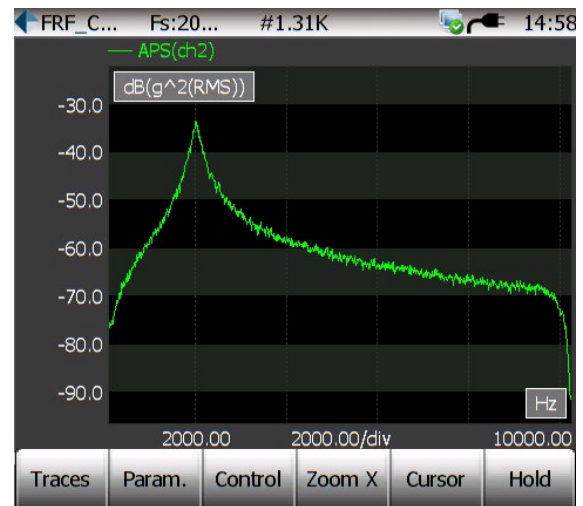
CONFIGURABLE SIGNAL ANALYSIS
FOR DYNAMIC SIGNAL ANALYZERS

Configurable Signal Analysis (CSA) is a new concept introduced and adopted by Crystal Instruments in its newest generation of dynamic signal analyzer systems, including the CoCo-80X. It allows the user to dynamically configure the DSP (Digital Signal Processing) functions so that the data processing flow can be customized from application to application. The result is a portable, customizable handheld signal analyzer which includes specialized, powerful functions while maintaining a very clean and simple user interface for day to day operation. CSA is a unique feature that is currently available only in Crystal Instruments products.

Unlike the traditional approach, CSA is user customizable. With CSA, the user can flexibly apply various math operations to live data streams without changing the installed program. The processing algorithm is a combination of user customizable math functions. Most of these algorithms are fairly simple, such as add, subtract, multiply and divide operations. Some others are very sophisticated, such as calculating the Frequency Response Functions (FRFs), between all the channels. The user can choose and apply the analysis functions of their choice, or combine them to meet their particular needs. The user can also cascade these algorithms in sequence combining several functions to generate a very advanced new function. With this approach, the CoCo DSP systems are enabled with "unlimited" application functionality.

CSA Editor

Customization of a CSA script is done within the CSA Editor which is integrated into the Crystal Instruments EDM software. The CSA Editor uses an intuitive drag and drop graphic interface that makes configuring the CSA an easy-to-learn visual process.

A typical CSA (configurable signal analysis) script

CONTINUOUS DATA RECORDING AND POST ANALYSIS

Introduction

In a time-critical test, it is highly desirable to record the raw time data continuously, so that the data can be analyzed later when more time is available for a complete review. Integral raw data recording eliminates the need for a separate recording device so necessary just a few years ago.
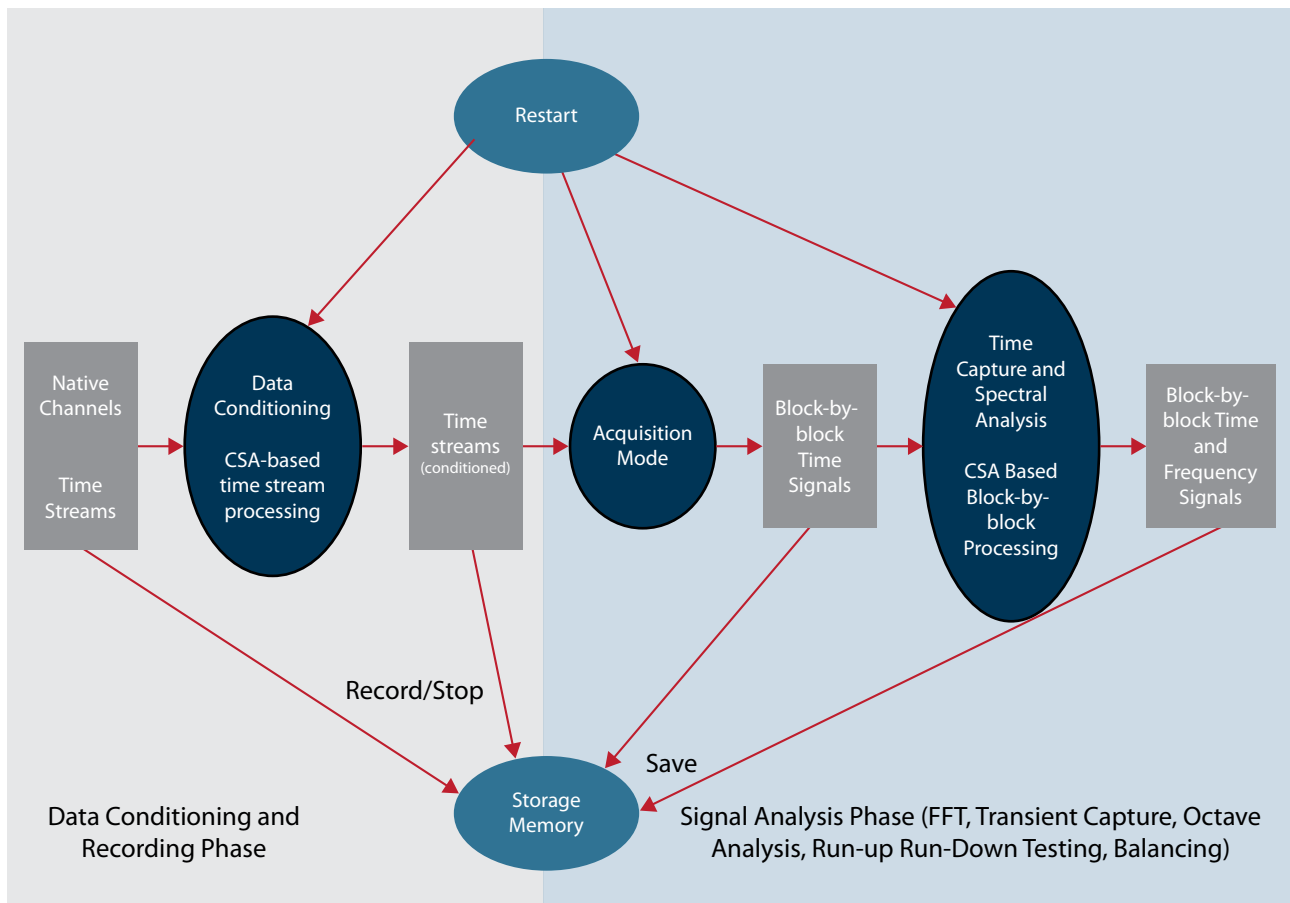
The CoCo and Spider platforms simultaneously perform both real-time processing and continuous data recording. In most of real-time applications, the raw data can be recorded at any desired sampling rate with full 32-bit floating point precision. To increase the reliability of data recording, a special check sum algorithm is always applied to the measurements.

For example in a typical FFT process, the raw data time streams (full bandwidth, sampled at the instrument's highest sample rate) and/or the continuous output of a bandwidth-reducing data conditioning process can be recorded at a lower sample rate on the system's storage media while the real-time filtering and spectral analysis is in progress. This same design philosophy is incorporated in both CoCo portable devices and Spider high channel count systems.
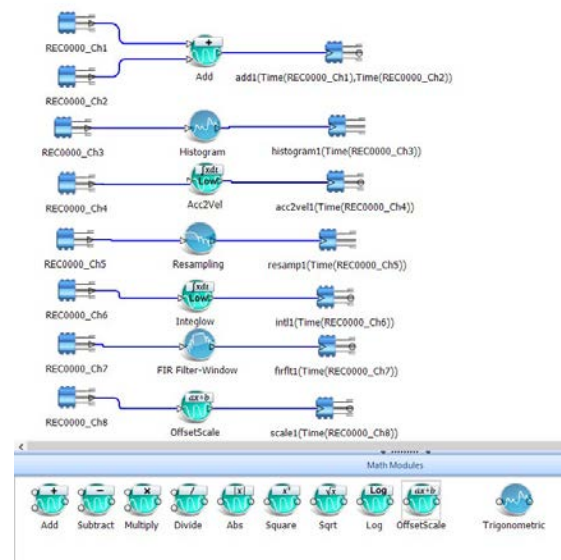
While being recorded, the measured values can be graphically displayed as y/t or y/x diagrams, as bar charts, as waterfalls, FFT, PSD, tachometer speed, or numerical statistics displays with a simple mouse-click. EDM software allows users to design an individual graphical visualization for each desired real-time measurement.

The recording system processes virtually every physical quantity, including: temperature, voltage, stress, strain, pressure, force, acceleration and frequency. Even high channel count applications using hundreds of channels can be configured within a very short time and are handled safely and efficiently.

The recording function is driven by user-defined events. On both CoCo and Spider front-ends the recording "action" can be initiated via various events, including: hard button press, user software command, defined trigger-condition event, digital input event, third party software command, defined alarm limit event, fixed timer, etc.
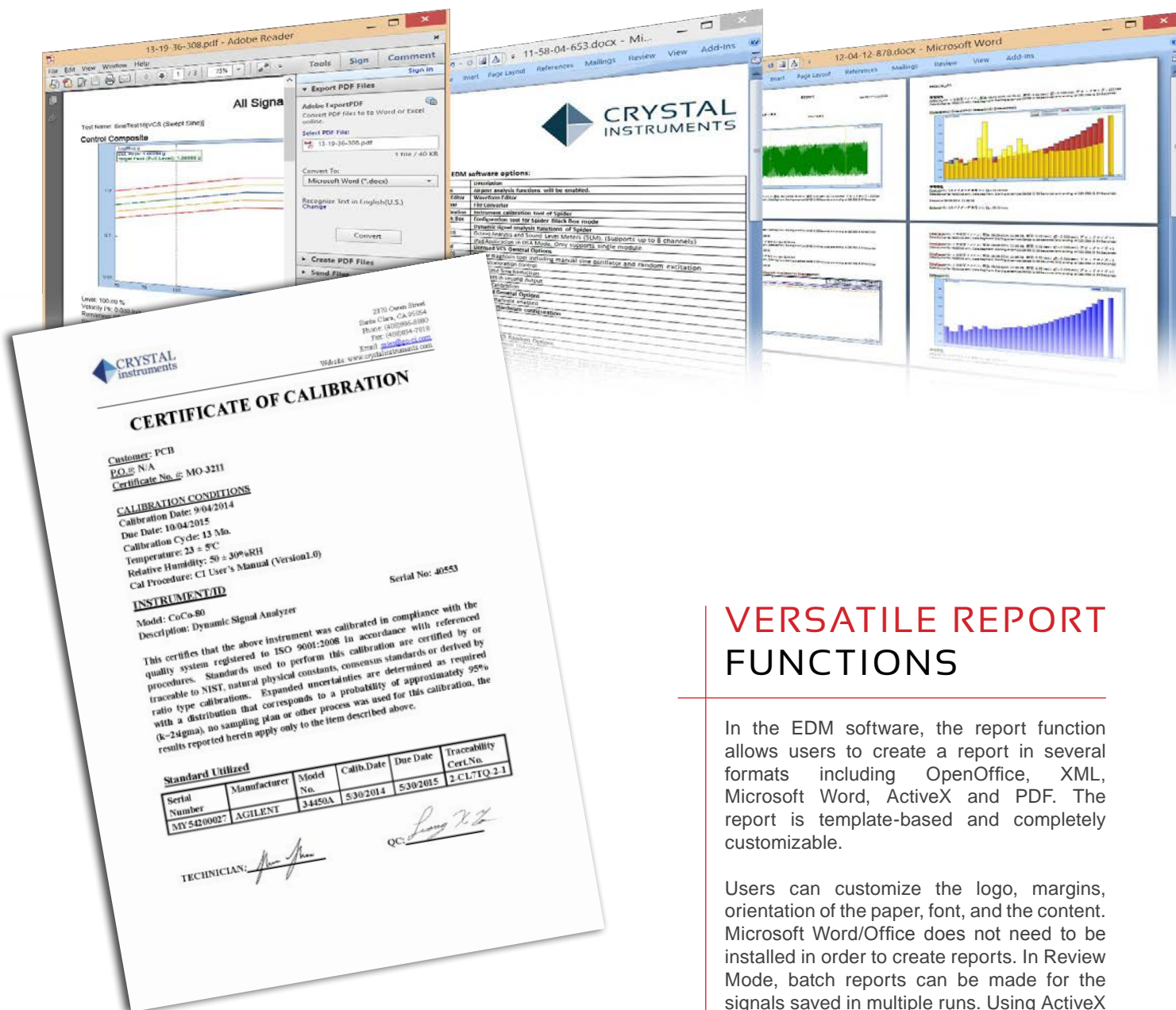
The CoCo handheld data recorders are a portable solution for continuous data recording.

Data Conditioning

Portable Recording Solution

The CoCo provides a portable solution for continuous data recording. Dedicated record and stop buttons are provided on the front panel enabling the user to initiate or terminate recording at any time. The storage media can be user selected as either the internal flash memory or the removable SD card. Using Configurable Signal Analysis (CSA) on the PC, the user can cause the CoCo to record not only selected raw time-streams, but also any filtered or processed time-streams such as RMS or peak values. The maximum data recording rate of the CoCo-80X is 102.4 kHz for 8 channels simultaneously. When less precision is required and longer duration is needed, a special compression function can be enabled to double the recording time. After the recording, there are two ways to make data easily available for post processing: Using EDM software to transfer the data into PC or, physically moving the CoCo SD card to the PC.
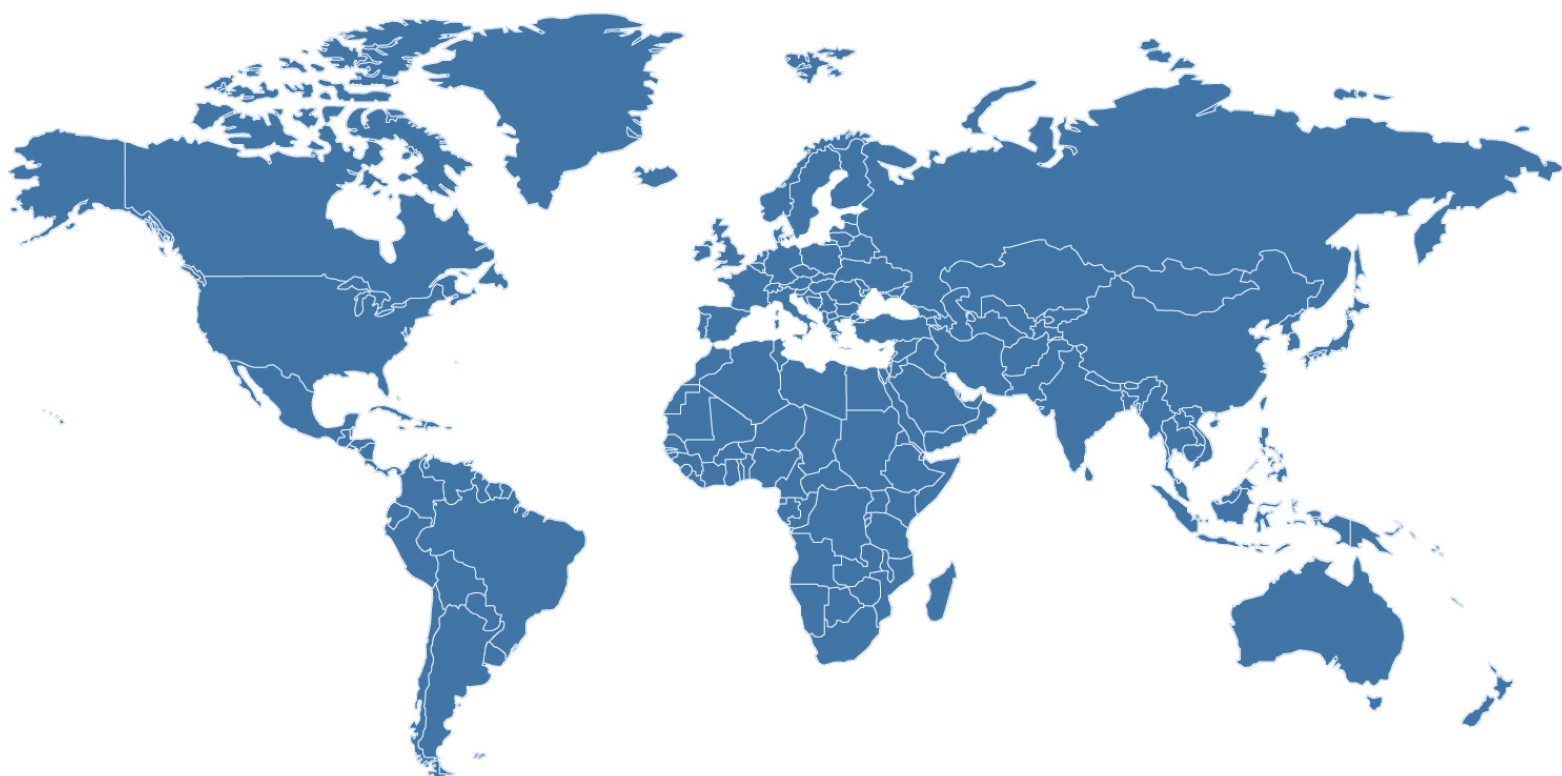
VERSATILE REPORT
FUNCTIONS

In the EDM software, the report function allows users to create a report in several formats including OpenOffice, XML, Microsoft Word, ActiveX and PDF. The report is template-based and completely customizable.

Users can customize the logo, margins, orientation of the paper, font, and the content. Microsoft Word/Office does not need to be installed in order to create reports. In Review Mode, batch reports can be made for the signals saved in multiple runs. Using ActiveX reporting, signal displays in the report can be rescaled, analyzed, and zoomed.

- User can select from various templates for creating reports
- Plot reports can be generated by simply right-clicking the mouse
- Company logos can be inserted into the template header or footer
- Reports can be in WORD, XML or PDF format
- "Active Report" allows the user to ZOOM in and out like a graph on the report
- Generate typical hardware calibration reports

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