

Creates Calculated Channels of any Length

Automatic File Management

Automatic Calibration

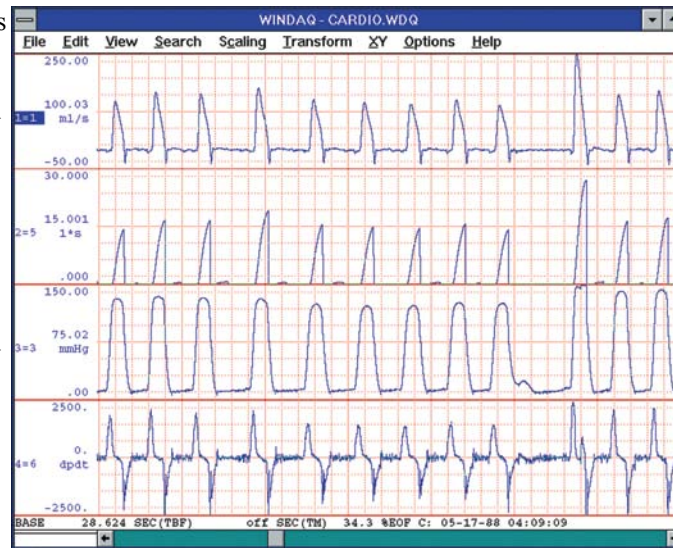
7 Waveform Calculation Modules

Seamless Access from Playback Software

Acquired Waveforms

Flow →

Pressure →



Calculated Waveforms

← ∫ Flow dt

← Volume

← d (Pressure)/dt

← dp/dt

The Waveforms displayed in windows 1 and 3 are the Advanced CODAS inputs. Advanced CODAS applied the desired analysis, calculates the resulting waveforms, and outputs the results in windows 2 and 4.

Advanced CODAS offers sophisticated analysis functions not available in WINDAQ Waveform Browser playback software. Beginning with acquired waveforms, Advanced CODAS creates calculated channels without ever leaving the WINDAQ Waveform Browser environment. The calculation functions, used individually or in any combination, may be applied to any waveform with fully automatic calibration in any desired unit of measure. Calculated channels are cleanly inserted into the waveform file and assume the characteristics of an acquired channel.

Features

Disk Streamer Performance

Generates calculated channels of any length limited only by the size of your hard drive.

Insert and Overwrite Modes

Advanced CODAS allows calculated waveforms to overwrite or append themselves to existing channels.

Menus Or Batch Files

A single keystroke from the Playback screen activates the Advanced CODAS menu system of easy-to-use scripts. Simply enter calculation parameters, and activate the function. Often-used scripts may be combined into a batch file.

7 Calculation Functions

Differentiator, Integrator, Rectifier, Moving Average Filter, Arithmetic Operations Utility, Peak and Valley Detector, and Report Generator.

Differentiator

Calculates a rate of change waveform with built-in, adjustable low pass filtering.

Integrator With 4 Reset Methods

Generates the area bounded by the curve reset on zero crossing of the input waveform, level of the output waveform, time, or as a function of an external event.

Rectifier

Used in the analysis of polarized signals, this function produces a rectified view of any waveform. Supported rectification functions are absolute value (full wave), and positive and negative unipolar (half wave).

Moving Average Filter

Also referred to as a boxcar integrator, use this utility for filtering noise, or for generating mean waveforms. The function can also simulate a high pass filter to eliminate base line shifting.

Arithmetic Operations

This function allows you to combine waveforms as a function of arbitrary mathematical formulas. Also supports phase shifting of selected waveforms in precise increments.

Peak and Valley Detector

Detects cycle-by-cycle inflection points (minimum and maximum excursion) on any periodic waveform. Allows peak-only, valley-only, and peak and valley selections.

Report Generator

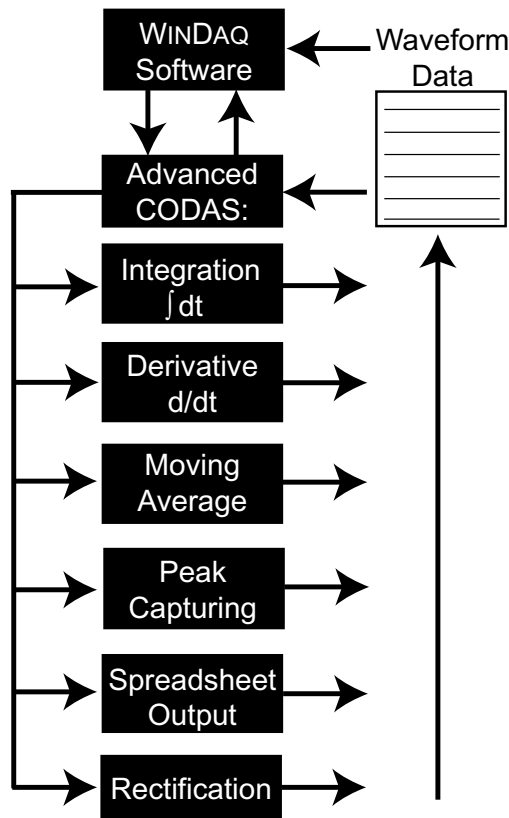
Generates a report of peak detected waveforms in spreadsheet (CSV) or ASYST/ASYSTANT format. Reports value at peak, value at valley, rate, and mean. Rate information may be reported in Hz, cycles per minute, or an interval in seconds. Reports values cycle-by-cycle, or on a multiple cycle averaging basis.

Specifications

Supported Software	WINDAQ
Program Capacities	
Data File Length:	Limited only by hard drive size.
Number of channels:	240 maximum.
User Interface	
DOS Command Line:	Single line DOS command for each Advanced CODAS utility. Suitable for batch file processing.
Menu Driven:	Menu-driven interface for ease-of-use allows each Advanced CODAS parameter to be specified independently.
Accessibility	
From DOS Command Level:	Operates on the entire waveform file specified by the command line.
From within WINDAQ using Cut/Paste:	Operates only on selected portions of the waveform file currently in use by the software
From within WINDAQ using hot key:	Operates on the entire waveform data file currently in use by the software.
Waveform Integral Function	
Integration reset methods:	As a function of time(t): 5 μ s to 145 hours (sample rate dependent). As a function of level (L): $-1.79 \times 10^{-308} L$ 1.79×10^{308} As a function of input waveform zero-crossing. As a function of peak capture markers from another channel. No reset.
Input rectification modes:	Bipolar (no rectification); Positive only (+ half wave); Negative only (- half wave); Absolute value (full wave).
Output waveform modes:	Continuous integrated waveform; Peak integral before reset with hold function.
Output waveform units:	Complete engineering unit preservation (input waveform units \times seconds).
Output waveform screen scaling:	Automatic for maximum signal transition.

Waveform Derivative Function	
Selectable output waveform filtering:	Smoothing factor of 2 (no smoothing) to 64, balanced.
Output waveform engineering units:	Complete engineering unit preservation (input waveform \div seconds).
Output waveform screen scaling:	Automatic for maximum signal preservation.
Waveform Rectification Function	
Input rectification modes:	Bipolar (no rectification); Positive only (+ half wave); Negative only (- half wave); Absolute value (full wave).
Output waveform engineering units:	Same as input waveform.
Output waveform screen scaling:	Same as input waveform.
Waveform Moving Average Function	
Selectable output waveform filtering (low pass):	Smoothing factor of 1 (no smoothing, for copying channels) to 10000, balanced.
Selectable output waveform filtering (high pass):	Smoothing factor of -10000 to -1 (no smoothing, for copying channels), balanced.
Output waveform engineering units:	Same as input waveform.
Output waveform screen scaling:	Same as input waveform.
Waveform Peak Capture Function	
Scope:	Sample-by-sample min and/or max waveform inflection detection.
Sensitivity:	Adjustable from 1 to 99% of peak signal excursions.
Output:	Marks input waveform with positive- and negative-going markers at detected inflection points. Markers may be viewed and edited by Playback software.
Waveform Report Generator Function	
Cycle definitions:	Peak-to-peak; peak-to-valley; valley-to-peak; valley-to-valley.
Output:	Value at peak and/or valley with corresponding sample numbers, mean, cycle time (selectable Hz, cycles/minute, or interval in seconds).
Output format:	Selectable spreadsheet (CSV) or ASYST/ASYSTANT.

Block Diagram



Waveform Mathematical Functions	
Supported operations:	+; -; \times ; \div ; sqrt; unary; exp; \log_{10} ; \log_e ; abs; phase shifting.
Max formula constant precision:	16 significant digits.
Formula grouping:	Supports parentheses () for grouped operations.
Max formula result range:	$\pm 1 \times 10^{308}$
Phase shifting range:	+1 to +20 samples.
Output Waveform Calibration:	Automatic for maximum signal transitions.
Computer System Requirements	
Computer:	Any computer capable of running Windows 95 or greater.
Supported Products:	WINDAQ Waveform Browser playback software.

Ordering Guide

Description	Order No.
Advanced CODAS Advanced analysis software add-on to WINDAQ Playback software with toolkit of 7 analysis functions.	Adv CODAS



241 Springside Drive
Akron, Ohio 44333
Phone: 330-668-1444
Fax: 330-666-5434
www.dataq.com

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