

EDM Time Data Acquisition Software Specifications



An intuitive software interface for acquiring, viewing and recording raw time data received from the input channels of any Spider front-end system.

Table of Contents

EDM Time Data Acquisition (TDA) Mode Software 2

• Time Data Acquisition (TDA-10).....	2
• Input Channels.....	2
• Black Box Mode: Operating Without a PC.....	2
• Variable Sampling Rate.....	2
• Time History (Continuous Time Data Recording to PC)2	
• Time Waveform Recording.....	2
• Automated Run Schedule	3
• Acquisition Mode.....	3
• Strain Measurement	3
• Temperature Measurement.....	3
• Timer Control (Only Available on the Spider-20 or Spider-20E).....	3
• Digital I/O Interface	3
• Test Management.....	4
• Spider Hardware System Management.....	4
• User Management and Access Code Control.....	4

• Self-Test.....	4
• Measurement Quantities.....	4
• Measurement Data Storage.....	4
• Export Data File Formats.....	4
• Import Data File Formats.....	4
• Languages	4
• Report	4
• Test Sequence	4
• Send Emails and Instant Message as Event-Actions	4
• Remote Operation Communication using Socket Messages	4
• System Failure Protection.....	4
• Event-Action Rules.....	4
• Output Channels	4
Front-End Calibration Tool (FECT).....	4
Supported Hardware Devices.....	5
PC Requirements for EDM Software.....	5
• Minimum System Requirements:.....	5
• Recommended System Requirements (Minimum for Spider systems higher than 16 channels):.....	5

EDM Time Data Acquisition (TDA) Mode Software

EDM (Engineering Data Management) is a PC-based software program designed for real-time data management and processing. It contains EDM Testing, EDM Machinery and EDM Utility installation packages.

EDM testing software now includes Time Data Acquisition (TDA) software, an intuitive software interface for acquiring, viewing and recording raw time data received from the input channels of any Spider front-end system. With the help of a variable sampling rate, users can select different sampling rates for each Spider front-end depending on the requirements. Using the time history, static measurements such as strain or temperature and raw time signals can be viewed for the entire duration of the test by continuously saving to the PC in real-time. Recorded raw time signals can also be used in Post Analyzer (PA), a post processing tool by Crystal Instruments designed for further processing.

Time Data Acquisition (TDA-10)

- *Maximum Input Channels in a System:* 1024
- *Maximum Sampling Rate:* 102.4 KHz for 8 channels/Spider front-end
- *Variable Sampling Rate:* user selectable sampling rate available for each module
- *Raw Time Recording Options:* manual, recording on trigger, automatic transient capture, complete duration of test
- *Trigger Options:* auto-arm with configurable pre-trigger duration, free run
- *Time History:* available for sampling rates <100Hz.

Input Channels

- *Location ID:* labels the physical point of UUTs or machines. Location ID is used to name signals.
- *Level Display:* bar graph displays the input level of each channel with 4 grids. Automatic IEPE sensor detection.
- *Sensitivity:* user-defined with engineering unit and input sensitivity setting
- *Input Types:* AC/DC, differential or single-ended, IEPE, charge coupling
- *TEDS:* read TEDS, read all TEDS
- *Integration/Differentiation:* when acceleration is selected as the measurement physical quantity, integration or double integration can be applied to obtain velocity or displacement quantity. When velocity is selected as the measurement quantity, integration or differentiation can be applied to obtain displacement or acceleration.
- *High-Pass Filter:* user-defined cut-off frequency

Black Box Mode: Operating Without a PC

A supported front-end can operate in Black Box mode, which allows it to acquire data without a PC. In this mode, a PC is used to only configure the system before the test and then to download the data after the test is complete. During the test, the front-end operates according to a pre-set schedule or through an external device such as a Wi-Fi enabled PDA or an iPad. Hardware versions 7.3 and higher can upload and store up to eight tests on each front-end.

Variable Sampling Rate

High channel count Spider systems support a variable sampling rate, enabling data acquisition at a customizable sampling rate for each Spider front-end. Users can conveniently configure the Spider-80Ti, Spider-80SG/SGi or other Spider-80Xi systems to achieve different sampling rates depending on the application. The modified sampling rates are derived from the master sampling rate which enables synchronized data acquisition across all front-ends even at different sampling rates.

Time History (Continuous Time Data Recording to PC)

The time history feature continuously acquires live data, saves to the PC memory and allows the user to view any part of live or historical data while the test is running. The user has options to view the entire history of the data along with live data updates or view live data for a specified duration or view any part of the historical data. Once the test is complete, the recordings are automatically saved to the PC storage space. Time History signals are currently available for time data with sampling rates less than 100 Hz, making it convenient for viewing static measurements including strain and temperature.

Time Waveform Recording

The Spider front-end can perform long time waveform recording during real-time data processing. Data is saved to either the internal flash memory or continuously to an external Spider-NAS. The data recording speed is independent of the number of channels. Recording on a high channel count system in Black Box mode is supported.

Maximum Data Recording Rate:

- *Single Front-end System:* all channels can continuously record simultaneously at a maximum rate of 102.4 kHz.
- *Multiple Front-end Systems:*
 - *Record to Flash:* up to 81.92 kHz for 1024 channels
 - *Record to Spider-NAS:* up to 81.92 kHz for 1024 channels
- *Typical Continuous Recording Time:* Records to the built-in 4 GB flash memory, the recording times are:
 - 4 hours for 4 input channels with a frequency range of 2,000 Hz
 - 19 minutes for 8 input channels with sampling rate of

102.4 kHz

- 3 hours and 12 minutes for 8 input channels with sampling rate of 10.24 kHz
- 24 hours and 31 minutes for 8 input channels with sampling rate of 1 kHz
- If the Spider-NAS is installed, the typical recording time for a 250 GB disk is: 4660 hours for 4 channels at 1 kHz/ch; 3 hours for a system with 64 inputs at 102.4 kHz/ch.
- **Begin Recording On:** Manually start recording by pushing buttons (default); when measurement starts; when input signal is triggered according to trigger condition; when digital input is received from input #, transient start
- **Stop Recording On:** when digital input is received from input #, transient stop
- **Recording Duration:** user specified, or until stopped by user; repeat # can be specified per defined event

Automated Run Schedule

The automated schedule allows the Spider front-end to run according to the Run Schedule. This function is supported in both PC tethered mode and Black Box mode.

- **Testing Schedule:** automatically control the test duration and automate the operation. Users can develop multiple testing schedules and execute one at a time. Testing schedule event entries: loop/end-loop, run duration, start recording, stop recording, turn signal source on and turn signal source off, user defined entries.
- **Testing Log and Summary Report:** a log file is automatically created for each run of the schedule to record up to 512 major events.
- **User Defined Event Strings:** the user can define the message strings of each event. The message strings can be displayed in the run log and the report.

Acquisition Mode

- **Mode Selection:** auto-arm trigger
- **Trigger Conditions:** trigger source > high level (rising edge); trigger source < low level (falling edge); low level < trigger source < high level; trigger source > high level OR trigger source < low level (bi-polar)
- **Trigger Delay:** $\pm 100\%$ (Up to 1024 points)
- **Trigger Setup Display:** a special display view is created for trigger setup. User selects the acquisition mode, trigger source, trigger level, trigger delay, and trigger condition
- **Trigger Run-Time Display:** in manual arm-mode, a smaller window will pop up for the user to accept or reject the transient captured signals. Only accepted signals are averaged into the spectra.

Strain Measurement

As an integrated function in TDA mode, users can measure strain with the Spider-80SG or Spider-80SGi hardware. Full, half and quarter bridge configurations are compatible. This integrated design allows acquisition to strain signals simultaneously with other measurement quantities.

- **Shunt Calibration** consists of three convenient steps. (1) Locate the shunt resistor, (2) measure the input, and (3) finalize calibration. The software allows users to switch the location of the shunt resistor between available bridge legs.
- **Offset-Nulling** simplifies the bridge-balancing process. The process can combine with shunt calibration in one step, resulting in a balanced and calibrated strain gage.
- **Remote Sensing** enables long-distance measurements. This function allows users to place the UUT at a further distance from the Spider-80SG or Spider-80SGi system while measuring strain without sacrificing any accuracy.

Temperature Measurement

Combine a Spider system with a Spider-80Ti front-end to enable temperature measurements in Spider TDA mode. Each Spider-80Ti provides up to 16 channels for temperature measurement using 3 wire RTD/K-type-thermocouple inputs.

Timer Control (Only Available on the Spider-20 or Spider-20E)

The timer setting function for the Spider-20 and Spider-20E allows users to set up a time to automatically to turn the device on or off. For long term data monitoring and acquisition, timer control extends the acquisition time of the Spider-20 or Spider-20E by turning the device off when acquisition is not required.

Digital I/O Interface

Each Spider-81 front-end has 8 isolated digital inputs and 8 isolated digital outputs (Spider-81B, Spider-80X, & Spider-80Xi have 4 of each), corresponding to the pins on the Digital I/O connector, which is used to send and receive low level electrical signals to and from other devices to coordinate their operation during a test.

Configurable Actions for Digital Inputs: start test, flash screen, beep, create report, capture screen, send socket message, send emails, set digital output signals, start recording, stop recording, save signals in the list, reset average, top the test, limit check on, limit check off

Configurable Digital Input and Output: each isolated pin is configurable to be used as a digital input or output. This flexibility allows users to change the number of digital inputs or outputs according to their application. (Available for Spider-80X or Spider-80Xi only.)

Output Pulse Types: High-Low, Low-High and variations

Test Management

Tests are managed through a MSSQL Server database. Signal files, test setup, and UUT (machine) information are stored in the database. The user can search through previous tests using keywords, time, or date information. The database installs on a local computer or server on LAN.

Spider Hardware System Management

A Spider system consists of one or more Spider front-ends. The user constructs the system by combining Spider front-ends on the same LAN. The software validates and displays the hardware attributes of each Spider front-end.

User Management and Access Code Control

The administrator can edit access privileges of other users. Each Spider front-end has its own access control code to prevent unauthorized access.

Self-Test

Verifies the condition of the input and output channels using a precise internal signal source. Test validates that the input channels are within the manufacturer's tolerances.

Measurement Quantities

The user has an option to select from a wide range of measurement quantities. Typical measurement quantities include acceleration, velocity, displacement, force, strain, torque, temperature, voltage, angle, phase, resistance, pressure, voltage, angular velocity, current, sound pressure, and mass.

Measurement Data Storage

- *Data Format:* compliant with ASAM-ODS hierarchy and structure
- *Signal Data Structure:* all signals are combined and saved into one file per each save command executed

Export Data File Formats

- ASAM-ODS XML, UFF ASCII, UFF Binary, ASCII, Excel, CSV, Matlab, .Wav

Import Data File Formats

ASAM-ODS XML, UFF ASCII, UFF Binary, ASCII, Excel CSV, SIG

Languages

English, Russian, Japanese, Simplified and Traditional Chinese are available. Languages can be switched without reinstalling software.

Report

Formats Available: Open XML, MS Word (.doc, .docx), PDF

Test Sequence

Create a list of tests and run them sequentially. Test sequences can be initiated and controlled by a user command, digital input event, or Windows socket message.

Send Emails and Instant Message as Event-Actions

The ability to send emails or instant messages as custom actions in response to a system or user event. Users can customize the content of emails.

Remote Operation Communication using Socket Messages

Communicate with and control Spider systems remotely using Windows socket messages. Socket messages also allow communication with other hardware, such as temperature chambers. Please refer to the Socket Message document for detailed specifications.

System Failure Protection

- *Power Loss Emergency Shutdown:* When a power loss is detected, the system will save all test data into non-volatile flash memory and safely shut down.
- *Ethernet Connection Loss Detection:* When a network loss is detected, the system can be configured to either save all the data and to ramp down the test or to continue running the test in Black Box mode.

Event-Action Rules

Test events such as triggered or digital inputs received will trigger the user-assignable actions.

- *Event Type:* system generated events or user-defined events: connection lost, triggered, user-stop, channel overload, download complete
- *Actions:* flash screen, beep, create report, capture screen, digital output (user defined pin), start recording, stop recording, send email, send message to other program, stop the test

Output Channels

The output channels provide signal sources and generate user determined waveforms. Multiple output channels may generate signals independently or simultaneously. The Spider-80X and Spider-80Xi are equipped with two output channels but only one is enabled. An option (S80-P09) is available to enable the second output.

Output Types: Sine, Triangle, Square, White noise, Pink noise, DC, Chirp, Swept Sine, Arbitrary Waveform, Shaped Random, Playback Signals

Front-End Calibration Tool (FECT)

The front-end is calibrated at the factory prior to shipping and should be recalibrated annually by a factory authorized calibration service. EDM has an optional stand-alone

Front-End Calibration Tool (FECT) that is operable by either the user or a calibration specialist. Calibration data is stored inside the Spider front-end.

FECT Functions: The calibration software calibrates the signal source and adjusts the DC and AC gains and offset. It also calibrates the input channels at all coupling types and adjusts the DC and AC error. The report includes the model number, text for the calibration meter, and the calibration operator's name. The report is viewed or printed from the host PC. For more details, please refer to the FECT specifications document.

Supported Hardware Devices

- Spider-81/81B
- Spider-80X/80Xi
- Spider-80SG/80SGi
- Spider-80Ti
- Spider-20/20E

PC Requirements for EDM Software

Minimum System Requirements:

- *Operating System Support:* Windows 7 SP1 or higher
- *Operating System Type:* 32-bit or 64-bit
- *Processor Speed:* 1.5 GHz Dual-Core x86
- *RAM:* 4 GB
- *Available Storage Space:* 10 GB

Recommended System Requirements (Minimum for Spider systems higher than 16 channels):

- *Operating System:* Windows 10, 64-bit
- *Processor:* Intel Core i7, 2.0 GHz or Higher
- *RAM:* 8GB DDR3 1600 or higher
- *Available Storage Space:* 10 GB

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