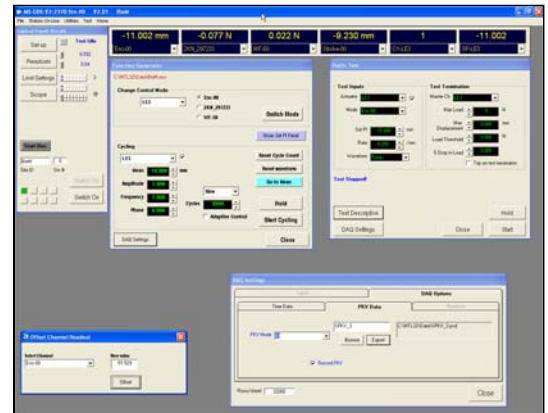


### 2360 Multi-channel Digital Servocontroller for Central Lab Management

Highly integrated hardware and software designed specifically for mechanical test system measurement and control applications. The 2360 lab automation system is designed to control multiple channels and test stations of electromechanical, electrodynamic and servohydraulic load frames and actuators.

#### Applications ...

- Planar and Axial Torsion Biaxial Test Rigs
- Central Lab Management of Test Machines
- Materials & Structures Test Rigs
- Retrofits & Upgrades
- Up to 16 test stations (independent actuators).
- Up to 80 signal conditioners
- 256X higher control resolution than older 16 bit controllers.



#### Overview

The 2360 Controller delivers advancements in performance, functionality and affordability, and compatibility with Global Data Sharing (GDS) open architecture software. The 2360 is available in two compact configurations and include power supply, strain bridge feedback channels for load cells or extensometers, AC type signal conditioners for LVDT transducers, inputs for 10V analog signals, and a digital encoder control channel. Two servo-output channels provide 10V signals to servo controlled actuators. Digital input and output bits provide drive and device control including hydraulic pump on/off or high/low pressure management in servohydraulic applications.

#### High Speed – High Resolution – High Accuracy

- High Speed (300 MIPS) Digital Signal Processor
- 24 bit Analog Data Conversion
- 32 bit Data acquisition
- 40 bit Servo-Loop
- Modular Global Data Sharing (GDS) Software
- Latest analog, digital and hybrid IC's

**With 24 bit hardware resolution, the 2360** delivers unmatched measurement and control quality. Internal high speed 40 bit computations update the control loop continuously, delivering unmatched servo-output control quality. Data acquisition speed is configuration dependent – but fast.

For lower channel measurement and control applications, consider our 2370 Controller. The 2370 is just as fast and accurate and controls one or two actuators with 24 bit resolution. When used with TestResources actuators high resolution translates to improved machine control in testing applications. Our systems are typically configured with digital encoders, LVDT's and Deflectometers or extensometers for position and strain control applications.

Consider our claims of high precision control:

- 100 mm full range LVDT can control position to 100 micron... (1000000:1)
- 1 mm Deflectometer or extensometer can control deflection to 1 micron. .. (1000000:1)
- 5000 N load cell can control load to 5 N and better ( depending on sample behavior) ...

## Multi-Station Applications

The 2360 may be configured to control a single test station or actuator, and up to sixteen actuators, frames or a mixture of both.

## Compatible Software Products

**MachineBuilder Software Program** (MTL32) enables user setup and association of machine resources (e.g. transducers) to test stations or actuators. It includes panels for servotuning, calibration, and global limit setting. The user may set up and switch test station configurations easily.

**TestBuilder Software Program** (MS32) is an application program which enables users to set up, launch, monitor tests. Test data may be saved and exported for reports. Separate user panels are available for static and fatigue tests. Users create, store and execute tests including command signal, data acquisition and export of data to Excel.

**Global Data Sharing Toolkit** is an optional application developer's support program that facilitates software components and full applications development. GDS is a powerful capability that shortens the test development process and brings significant advantages to customers. Ask for more information on GDS.

**Standard Test Application** programs are available for common standardized test methods (ASTM, etc).

**Engineered to Order Application Software** serves the needs of speeding the creation of complex test protocols or analyses, or creating software for specific needs. Application programs are made to order.

## 2360 Specifications

Model	2360 Minimum Configuration	Maximum Configuration
Enclosure Size	19" rack mount or vertical tower	Same
Digital Position Channels	1 encoder	16 encoders
Strain Bridge Conditioners (load cell, extensometer, LVDT)	4 channels	80 channels
Servo-outputs	8 channels (0 to 10V)	16 channels (0 to 10V)
Digital Inputs	8 Channels	32 Channels
Digital Outputs	8 Channels	48 Channels

## 2360 Description

**Expandable 19" Rack Hardware Platform** - for multistation and multiaxis applications - plug in cards – configured to requirements.

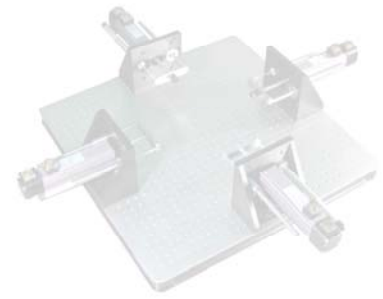
- Rack or Tower Style enclosure - 300 MIPS DSP and 24-bit electronics.
- Control system is configured to specific requirements using modular cards (servo-output channels, signal conditioning, digital IO, data acquisition and power pack requirements).
- Acquire up to 96 channels data acquisition (6 each 16 channel cards)
- Signal conditioners expand to large count (80) LVDT, Load cells and other sensors including encoders.
- Servo-output 8 Channels on motherboard (plug in card for 8 additional channels)

## MS Software – compatible with both hardware packages

MS Control Software Program is 32 bit, compatible and based on global data sharing (GDS) software platform. See separate documentation for GDS overview.

## Test Machine Control and Interfacing

- All input channels are subject to software reallocation - no need to reconnect transducers shared between stations.
- User can set up any mix of independent test stations and synchronized actuators - to a maximum of 16 control channels.
- Servotuning features including PID basic, PID advanced, Adaptive control, Feed-forward, etc.
- High speed (to 12.5 kHz) 32-bit digital loop closure update with 40-bit internal computations.
- Software settings of analog signal conditioning include 2 levels of strain bridge gain control, 3 levels of input offset control.



- 2 kHz 16-pole analog filters on signal conditioning inputs. Additional digital filters on 24-bit analog to digital converters and user selectable Butterworth / Bessel / Chebyshev / Elliptical filters on input data.

## Measurement and Data Acquisition

- High speed continuous 32-bit data acquisition from all channels. Data acquisition rate on system ranges from 12.5 kHz to ~ 600 Hz when 100 channels are logged simultaneously. Performance of default configurations shown below:

Control CH	Feedback CH	Loop closure (kHz)	Max. Log Rate (kHz)
2	8	5.0	5.0
1-8	16	4.0 – 4.5	1.5-2.0
1-8	32	3.0-4.0	1.0-1.5

- Centralized data acquisition and data sorting process in GDS environment.
- Up to 100 channels of acquired inputs and up to 40 channels of internally generated inputs (total 140 channels) of real-time streamed data from controller to PC at a sustained (indefinite duration) data throughput of 50,000 32-bit readouts a second.
- Applications can queue data logging requests based on time of day, prescribed cycle count, external event, etc.
- No limitation on the number of data acquisition channels per actuator.
- No restriction on duplication of channels – sharing one channel amongst multiple actuators. e.g., logging of room temperature on multiple actuators.
- No data duplication, nor associated memory and CPU overheads.
- 32-bit readout on all channels
- All acquired inputs synchronized by common clocking.
- User selectable filter settings on all acquired inputs.
- Inter-channel synchronization option to compensate for signal conditioning latency and transducer response (for vibration analysis and elastomer tests)

## Global Data Sharing (GDS) Software Platform includes Real-time interface with Microsoft Office Products, including Access, Excel, Word & PowerPoint.

- Full test machine control, data acquisition and analysis applications may be developed as an embedded macro within a Microsoft Office document
- Standalone applications may be developed to operate independent and concurrently with MS control software.
- Open source development makes it possible for customers to edit and modify programs to suit specific requirements.
- Multiple Microsoft Office applications are possible in real-time, including real time numeric displays and real time plotting using objects.
- Real-time data transfers between MS control software and Microsoft Office without using hard disk storage.
- Labview and C programming development tools available.

## About TestResources ...

TestResources is a test engineering firm that supplies test machines, testing accessories and control systems to engineers, researchers and industry, government and research organizations. Our core competence is in the application engineering of servocontrol technology to single and multichannel control of mechanical testing applications, and the supply of static, dynamic and fatigue test machines.

## Want more information or want a demo?

Call 1.800.430.6536 or contact us at [info@testresources.com](mailto:info@testresources.com)