

# SMART MATERIALS AND ADAPTIVE STRUCTURES LAB



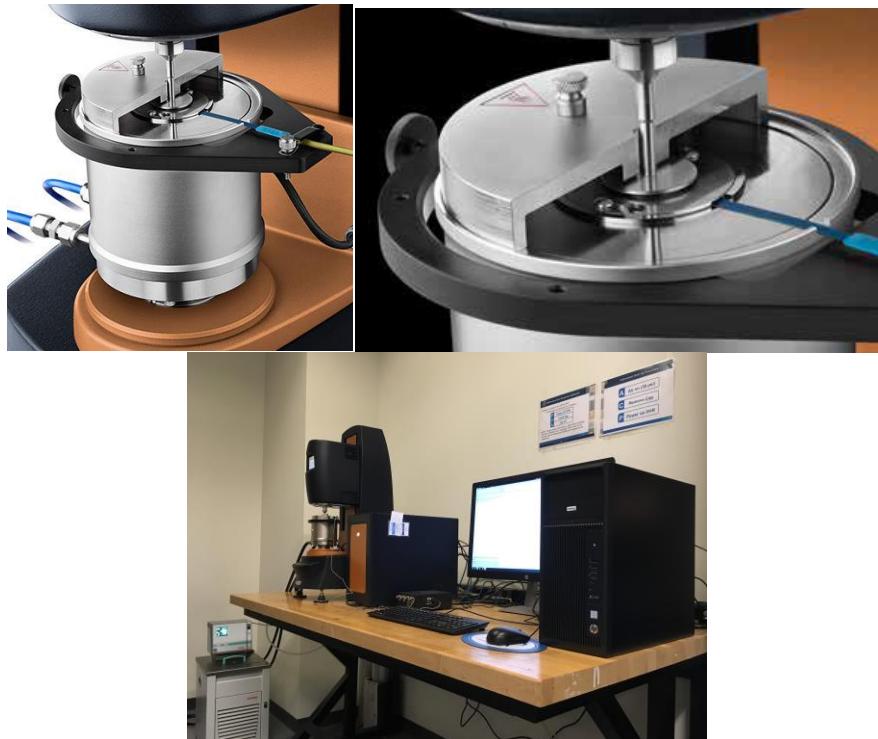
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## 1. Discovery Hybrid Rheometer HR-3

TA Instruments

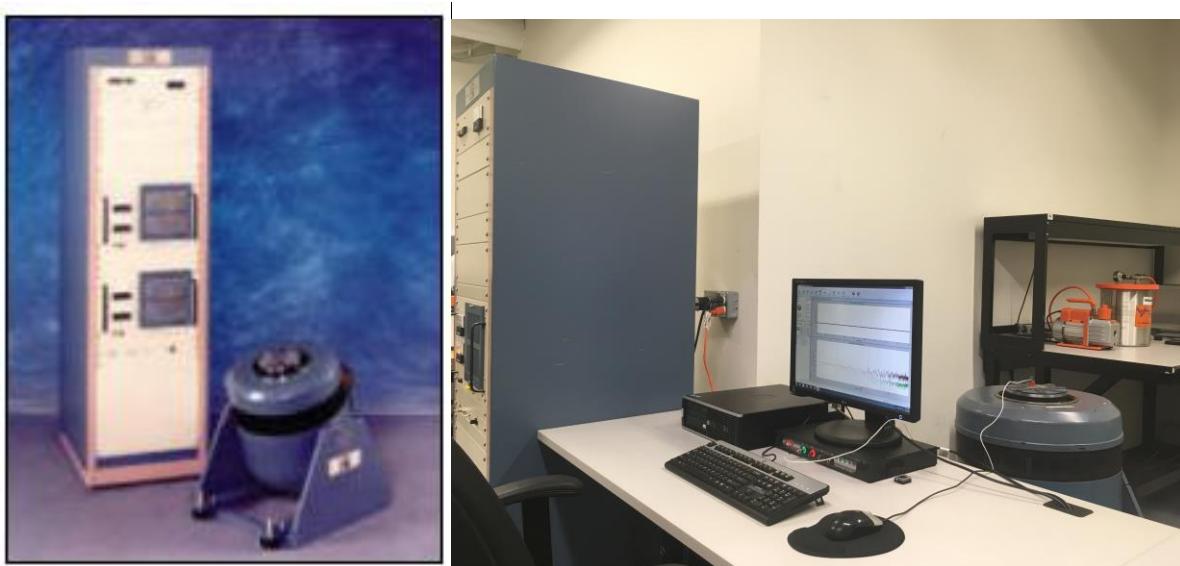


### *Features & Specifications:*

- Smart Swap™ technology for quick installation
- Complete control of magnetic field profiles, including: constant, step, ramp, sine wave, triangle-wave, and wave functions with field offset
- Patented Force Rebalance Transducer (FRT) minimizes axial compliance
- Applied a homogeneous magnetic field up to 1 T
- Changing the sample temperature from -10 °C to 170 °C

## 2. Electrodynamic Shaker Systems S062 / S092

Unholtz-Dickie Corporation

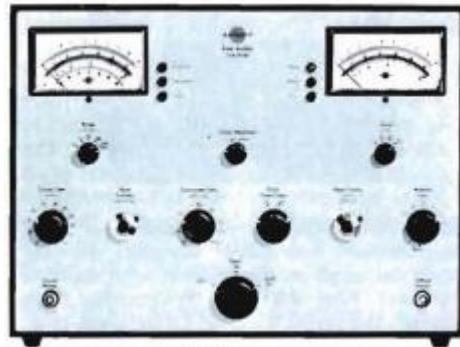


### *Features & Specifications:*

- 600 to 1,000 lbs (2.7 to 4.4 kN) Force
- Armature Weight with Inserts 10 lbs (4.5 kg)
- 600 - 1500 g Shock
- 2 inch (51 mm) Displacement (Intermittent)
- 7 inch (178 mm) Diameter Armature, 6 inch (152 mm) Outer Bolt Hole Circle
- 13.3 inch (337 mm) Diameter Armature, 12 inch (305 mm) Outer Bolt Hole Circle
- Pedestal Base
- Linear and Switching Power Amplifier Configurations
- Completely Air Cooled
- Easy Installation
- Combined Environment Support

### 3. Interchangeable Head Vibration Exciters Type 4801

Brüel & Kjær



#### *Features & Specifications:*

- Exciter Head and an Exciter Body
- The program includes three sizes of vibration exciters, with four or five heads for each size
- The heads of the smallest size, size V, have force ratings of 85 and 100 pounds, 380 and 445 N
- The heads of the next larger size, size S, have force ratings of 325 and 400 pounds, 1445 and 1780 N
- The heads of the largest size, size M, have force ratings of 1200 and 1500 pounds, 5340 and 6670 N

## 4. ME'scopeVES

Vibrant Technology



### *Features & Specifications:*

- FRF-Based Modal Analysis
- Operational Modal Analysis
- Vibrio-Acoustic Analysis
- Dynamics Modeling & Simulation
- Structural Dynamics Modification
- Experimental FEA

## 5. VR9500 Revolution Vibration Controller

Vibration Research



### *Features & Specifications:*

- Front End Signal Processing Box. The Revolution uses a high speed RISC processor, which is capable of quickly processing large amounts of data
- High Sample Rates. Runs vibration tests efficiently at both low and high sample rates, and with up to 26,000 lines of resolution for random testing
- PC Configuration. Does NOT require any board in the PC. All the critical calculations are done directly in the hardware box, with the results communicated via Ethernet connection to the PC
- Low PC Requirements. The PC is only used for user interface and data storage so the PC requirements are quite low
- High Analog Channel Count. From 1 to 128 input channels (in blocks of 4 channel controllers)
- Control Loops. Up to 4 simultaneous control loops
- Ethernet connection
- TEDS Interface - the software reads the calibration information right off of the accelerometers (if available)
- Power requirements: 90-250VAC, 50/60Hz, 1.2/0.7A

## 6. Multichannel Analysis Systems Type 2827-2

Brüel & Kjær



### *Features & Specifications:*

- Generator, 4/2-ch. Input/Output Module – Type:3109
- 0 Hz to 25.6 kHz frequency range
- 4 input and 2 generator output
- Direct/CCLD/Mic., Preamp., 1 Tacho Conditioning

## 7. CLP1104 Combined Connector/LED Panel

dSPACE



### *Features & Specifications:*

- BNC Connectors:
  - *8 ADC inputs.*
  - *8 DAC outputs.*
- Sub-D Connectors:
  - *Digital I/O.*
  - *Slave DSP I/O.*
  - *Incremental encoder interfaces.*
  - *Serial interfaces.*
- Access analog signals via BNC connectors.
- Access digital signals via Sub-D connectors.
- Sub-D connectors are grouped according to I/O channels or functional units.
- LED panels indicate the status of the board's digital signals.

## 8. Multichannel Analysis Systems Type 2035

Brüel & Kjær



### *Features & Specifications:*

- Modular, expandable system (2 to 16 channels).
- 1-channel 25 kHz or 100 kHz input modules.
- 4-channel 25 kHz input modules.
- Generator output; sine, multi-sine, random, pseudo random.
- User definable auto-sequences, functions and generator signals.
- PC/MS-DOS disk storage for measurement, setups, user definable functions and auto-sequences.

## 9. Sound and Vibration Modules – NI-9234 and NI-9263

National Instruments



*Model: NI-9234*

*Features & Specifications:*

- four-channel dynamic signal acquisition module
- Software-selectable AC/DC coupling (AC coupled at 0.5 Hz)
- Software-selectable IEPE signal conditioning with AC coupling (2 mA)
- -40 °C to 70 °C operating, 5 g vibration, 50 g shock
- 24-bit resolution
- Anti-aliasing filters
- 102 dB dynamic range
- Smart TEDS sensor compatibility

*Model: NI-9263*

*Features & Specifications:*

- 4-Channel C Series Voltage Output Module
- Screw-terminal or spring-terminal connectivity
- 0 Vrms, CAT II, channel-to-earth isolation
- 100 kS simultaneous per channel

## **10. Double-Yoke Single-Tuning Adjustable Air Gap Electromagnet Type DXSBV-100**

Dexing Magnet Tech. Co., Ltd



### *Features & Specifications:*

- Adjustable air gap
- Three different pole sizes: 40 mm, 80 mm and 100 mm
- Natural air cooling
- Proving magnetic field up to 2.3 Tesla for 10 mm air gap

## 11. Regulated Adjustable Switching DC Power Supply Model HY10010EX

VOLTEQ



### Features & Specifications:

- Two level of control for both current and voltage outputs: coarse and fine for ease of use
- Outputs: 0-100 V and 0-10 A
- Protection: over-voltage and over-current protection
- Input voltage: 110V AC and 220V AC switchable
- Voltage Stabilization:  $\leq 0.2\%$
- Current Stabilization:  $\leq 0.5\%$
- Load Regulation:  $\leq 0.3\%$
- Ripple noise: CV  $\leq 1\%$
- LCD reading accuracy:  $\pm 1\% \pm 1$  digit
- Environment: 0-40C, relative humidity < 90%

## 12. Dual Output DC Power Supply Model 20-25

Anatek



### Features & Specifications:

- Input: 117 VAC, 60 HZ, 1.6A
- 2 Outputs: 0-25 VDC, 0-2A

### 13. Triple output power supply LXD-30

XANTREX



#### Features & Specifications:

- 2 x 0-30V, 0-2A outputs.

## **14. Regulated DC power supply 32V 2A Model PAB 32-2**

Kikusui



Features & Specifications:

- 0-32V, 0-2A outputs.

## 15. 33220A Function / Arbitrary Waveform Generator, 20 MHz

Agilent Technologies



### Features & Specifications:

- 20 MHz sine and square waveforms
- Ramp, triangle, noise, pulse generation with variable edge, and DC waveforms
- 14-bit, 50 MSa/s, 64 Kpoint arbitrary waveforms
- AM, FM, PM, FSK, and PWM Modulation, Linear & logarithmic sweeps and burst all standard

## **16. 54624A 4-Channel, 100 MHz Oscilloscope**

Agilent Technologies



### **Features & Specifications:**

- Enhanced serial triggering capabilities and integrated 5-digit frequency counter measurement.
- Lower cost deep memory 4-channel scope on the market
- Unique 4-channel model
- 100 MHz, 200 MSa/s
- 2 MB of MegaZoom deep memory per channel
- Patented high-definition display
- Flexible triggering including I<sup>2</sup>C, SPI, CAN and USB

## **17. Induction motor**

GEC- Small machine



### Features & Specifications:

- Protection type: IP 44
- Insulation class: B
- Cooling type: ICO141
- RATED frequency: 50Hz (60Hz)

## 18. Magnetorheological fluid

LORD Corporation



MRF 122EG

- Appearance: Dark Gray Liquid
- Viscosity, Pa-s @ 40°C (104°F):  $0.042 \pm 0.020$
- Density g/cm<sup>3</sup> 2.28-2.48
- Solids Content by Weight %: 72
- Operating Temperature, °C (°F): -40 to +130 (-40 to +266)

MRF 132DG

- Appearance: Dark Gray Liquid
- Viscosity, Pa-s @ 40°C (104°F):  $0.112 \pm 0.020$
- Density g/cm<sup>3</sup> 2.95-3.15
- Solids Content by Weight %: 80.98
- Operating Temperature, °C (°F): -40 to +130 (-40 to +266)

MRF 140CG

- Appearance: Dark Gray Liquid
- Viscosity, Pa-s @ 40°C (104°F):  $0.280 \pm 0.070$
- Density g/cm<sup>3</sup> 3.54-3.74
- Solids Content by Weight %: 85.44
- Operating Temperature, °C (°F): -40 to +130 (-40 to +266)

## **19. Carbonyl Iron Powder**

BASF – The Chemical Company



### Carbonyl Iron Powder EM

- Type: Hard
- D50 Value: 4.5-6 microns

### Carbonyl Iron Powder SQ

- Type: Soft
- D50 Value: 3.9-5.0 microns

### Carbonyl Iron Powder CF

- Type: Soft
- D50 Value: 9.5 microns

## 20. Gaussmeter Model GM2

AlphaLab, Inc



### Features & Specifications:

- High dynamic range: can measure even a small variation in a large DC, AC or peak magnetic field.
- Programmable alarm will sound either if field exceeds a level you set or if the field is between lower and upper levels you set.
- Intuitive to use with rapid turn on, fast update. Begin reading DC field, AC f field, or peak field just by turning the knob. No setup or calibration required.
- Peak hold function shows the highest DC level with fast 0.002 sec capture window; also displays polarity of the peak.
- Interchangeable probes: range 30k G with ST probes; 800 G (0.01 G resolution) with HS probes.
- Runs on battery or AC adapter (included).
- Includes analog output connector, certificate of calibration.
- CE Compliant.

## **21. Permanent magnet and electromagnet**

120 V.A.C. Electromagnets



Neodymium Block Magnets



Ceramic magnet



## 22. Light weight accelerometers

Model: 356A03.

- Platinum Stock Products; Triaxial, lightweight miniature, ceramic shear ICP® accelerometer, 10 mV/g, 0.25" cube



2 × Model: 352C03.

- Platinum Stock Products; General purpose, ceramic shear ICP® accelerometer, 10 mV/g, 0.5 to 10k Hz, 10-32 side connector



2 × Model: 353B15

- Platinum Stock Products; High frequency, quartz shear ICP® accel., 10 mV/g, 1 to 10k Hz, 5-44 side connector



Model: 288D01

- ICP® impedance head, force/accel: Force: 100 mV/lb, range +/- 50 lbs; Accel: 100 mV/g, 50 g range



## 23. Microphones

PCB PIEZOTRONICS



2 × Model: 130E20

Features & Specifications:

- Response: Free-field
- Frequency range (-2 to +5 dB): 20-20k Hz
- Dynamic range: 122 dB
- Temperature range: -10 to 55 °C

## 24. Speaker Type C50A

Behringer



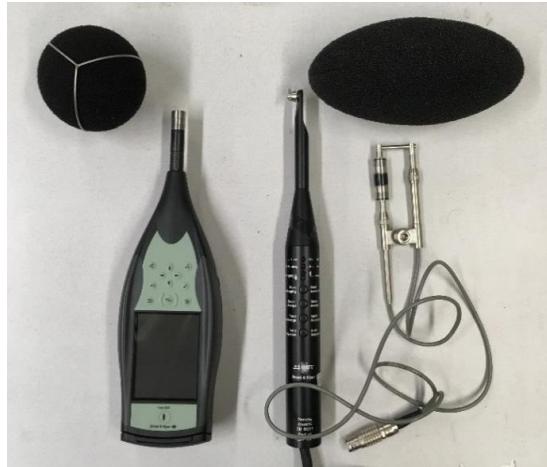
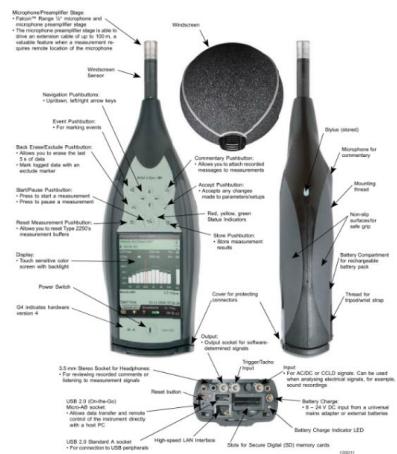
Model: Behringer C50A

Features & Specifications:

- Full-range 5 1/4" speaker with special diaphragm and deformation-resistant chassis
- Frequency response from 90 Hz to 17 kHz with zero crossover phase distortion
- Homogeneous dispersion pattern due to singular small-diaphragm full-range driver configuration
- 6 1/2" cube cabinet with multiple coats of high-gloss piano lacquer finish

## 25. Sound Level Meter Type 2250 and Sound Intensity Probe Type 3548

Brüel & Kjær



### Features & Specifications:

- Include the Sound Analysis, Frequency Analysis, Logging, Enhanced Logging and the Sound/Vibration Software
- Uses for
  - Class 1 measurements to latest standards
  - Environmental noise assessment and monitoring
  - Noise at Work assessment - Sound Exposure
  - Product development, quality control
  - Sound Recording - overall and event
  - Frequency and Time Histories, Broadband and Spectra
  - Vibration
  - Sound power and noise mapping
  - Noise source location
- Microphone included, accelerometers or direct signal input optional
- Large, high-resolution, touch sensitive color screen
- Data storage on plug-in memory cards
- Standard USB computer interface
- Dynamic range in excess of 120 dB
- Real-time analysis in 1/1 and 1/3 Octave Bands and FFT option
- 3 Hz - 20 kHz broadband linear frequency range
- Plug-in rechargeable Li-ion battery ≥ 8 hours

## **26. Laboratory Mixer**

Cole-Parmer



Model: Cole-Parmer Compact Digital Mixer System, 50 to 2500 rpm, 115 VAC

### Features & Specifications:

- Min Speed: 50 rpm
- Max Speed: 2500 rpm
- Max Torque: 14.2 in-oz

## **27. 3 Gallon Stainless Steel Vacuum and Degassing Chamber and 2RS-1 Vacuum Pump**

Best Value Vacs



Model: Best Value Vacs, 110V 60 Hz / 220V 50 Hz

### **Features & Specifications:**

- Dual voltage operation
- Ultimate vacuum rating as low as 50 microns
- Ultimate Vacuum: as low as 25 Microns (5 Pascals)
- Advanced air cooled motor design for operation in high ambient temperatures
- Exhaust port cap
- Flare port connection
- Easy maintenance with large oil sight glass and fill port with easily accessible oil drain port on the front.
- Rubber feet provides shock resistance and grip.
- Operating Temperature Range: 0°C (32°F) to 32°C (90°F)

## 28. 16 Pc Metric Hollow Punch Set

MAYHEW PRO



### Features & Specifications:

- Used to create precise gaskets and washers in softer materials; e.g. cloth, vinyl, leather, light sheer metal, and gasket material
- Wide array of sizes available for numerous ID and OD configurations
- Dual cutting heads allow the user to punch concentric circles in one strike

## 29. Convection Oven

Black + Decker



### Features & Specifications:

- 1500 Watts
- Temperature range of 150 to 450 °F

## 30. Scales

Taylor scale

- High Capacity up to 13.6 kg (30 lb.)
- Fine increments 0.5 g (0.01 oz.)

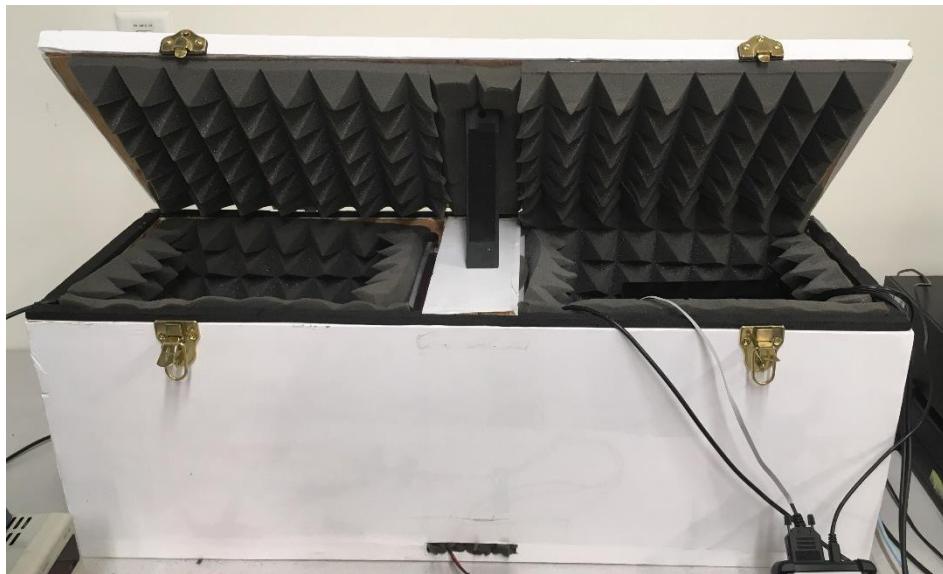


Amir scale

- Capacity from 0.4 g to 3000 g
- increments 0.1 g



## 31. Anechoic Box



### Features & Specifications:

- 91×33×34.5 cm<sup>3</sup> anechoic box
- Equipped with a electromagnet at the center
- Insulated using 2in. acoustic pyramid foam

## 32. Electromagnet



### Features & Specifications:

- 4200 turns 18 AWG copper wire coil
- Providing up to 600 Gauss for a 2.4 amp current input