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VT-9008-4	<p>New Econ 4-Channel Vibration Controller with PC &amp; Software for Sine, Random and Classical Shock Testing</p> <p><b>4 Channel Vibration Controller</b> 4 Voltage/IEPE/Charge/TEDS input channels (max.8 input channels, with built-in IEPE sensor power and charge amplifier); 1 drive channel and 1 COLA channel; 1 Digital I/O port with DB37 connectivity; 24-bit ADC/DAC, 32-bit floating DSP processing; Integrated manual abort button, Steel/aluminum case with shock guards; USB 2.0 connectivity; CE Compliance.</p> <p><b>Control Software Bundle</b> Random, Sine &amp; Classical Shock (9801, 9802, 9803) &amp; Self Calibration Software License</p> <p><b>Accessories</b> (1 pcs/copy for each system): USB 2.0 cable, Power cable, Software installation CD, User Manual, Ex-works calibration certificate, Pass code file</p>
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## Guarantee:

Unless otherwise specified, every machine is offered with the standard **MDNA** (*MACHINERY DEALERS NATIONAL ASSOCIATION*) Return privilege to ensure your complete satisfaction. If the machine is un-satisfactory it may be returned to our warehouse, freight prepaid and in the original condition within 30 Days of shipment for a full refund less the cost of **SPECIALIZED EQUIPMENT, NEW ITEMS AND RE-CERTIFICATION COSTS**, When applicable. Care is taken to provide accurate specifications. However, Critical areas should be verified by Inspection.

# ECON

## Vibration Controller

### Technical Specifications

UCON<sup>®</sup> series



Econ Technologies Co., Ltd.

**Overview**

UCON is a state-of-art vibration control system for electro-dynamic and servo-hydraulic shakers. It integrates the most advanced technologies of DSP computation, low noise hardware design, vibration control algorithms and data transmission.

UCON is also a multi-tasking system with the control loop independent from the PC, and focuses on fast responses, high performance and reliability, and powerful functions. Also it brings test engineers user-friendly software at their conveniences.

**Features**

- ✧ Close- loop control handled by a DSP processor independent from the PC to ensure real-time and efficiency of the system
- ✧ Dynamic range > 110 dB, 24-bit ADC and DAC, 32-bit float point DSP, land ow noise hardware design
- ✧ Random control dynamic range > 90 dB
- ✧ Sine control frequency range up to 10000 Hz, random control frequency range up to 18750 Hz
- ✧ Random resolution up to 6,400 Lines
- ✧ More than 20 safety checks and interlocks to ensure the safety of the personnel, test articles, and shaker equipments
- ✧ PC software based on Windows OS with multiple graphical interface, and cursor type, fonts, colors, etc. can be easily modified
- ✧ Professional test reports (supports Word/PDF format) can be automatically generated and printed after the test



**System Specifications**

Model	UCON VT-9002	UCON VT-9008	UCON VT-9016
Input	2 Voltage/ICP/Charge channels	8 Voltage/ICP/channels	16 Voltage/ICP channels
Drive	1	1	1
COLA Output	No	1	1
Digital I/O	No	Yes	
Dimensions			
Dimension (mm / in)	362x278x79 / 14.3x10.9x3.1	455x355x92 / 17.9x14.0x3.6	455x355x92 / 17.9x14.0x3.6
Weight (kg / lb)	2.9 / 6.4	4.6 / 10.1	4.7 / 10.4
Electrical Parameters			
Voltage	88 to 264 Volts, 47 to 63 Hz, auto sensing		
Power	40W	45W	60W
EMC	CE Compliance		
Environmental Parameters			
Temperature	41 to 113 °F / -10 to 50 °C		
Humidity	20% to 90% RH non-condensing (40 °C / 104 °F)		
PC Connections			
OS	Microsoft Windows XP / 7		
Interface	USB 2.0		

**I / O Specifications**

**Output**

Output Channels	1 Drive and 1 COLA (VT-9002 without COLA)
Output Connectors	BNC
Voltage Range	±10 V <sub>PEAK</sub>
Resolution	24-bit DAC
Output Impedance	30 Ω
Output load	Max.30 mA <sub>PEAK</sub>
Dynamic Range	100 dB
Reconstruction Filter	160 dB / Oct digital and analog filters
Amplitude accuracy	0.1 % (@1 kHz, 1 V <sub>input</sub> )
Frequency accuracy	0.001 %
Harmonic Distortion	< -95 dB (@1 kHz, Fifth harmonic)

**Input**

Input Channels	2 to 16
Input Connectors	BNC
Input Range	± 10 V <sub>PEAK</sub>
Max. input	± 36 V <sub>PEAK</sub>
Resolution	24-bit ADC
Input Impedance	220 kΩ
Dynamic Range	110 dB
Anti-aliasing Filter	Analog Anti-aliasing Filter and digital filter, Stop band attenuation greater than 160 dB / Oct
Coupling	AC, DC, IEPE, TEDS (optional), charge (VT-9002, VT-9008)
IEPE power supply	+24 V / +4 mA
Amplitude accuracy	0.5 % (@1 kHz, 1 V <sub>input</sub> )
Frequency Accuracy	0.001 %
Harmonic Distortion	< -100dB (@1 kHz, Fifth harmonic)
Channel match	
Amplitude	±0.05 dB (DC ~ 20 kHz)
Phase	±0.5 Degree (DC ~ 20 kHz)
SNR	100 dB (@1 kHz, 1 V <sub>input</sub> ) typical
Channel Crosstalk	< -105dB

**System Applications**

**VT-9002**

- Random
- Sine
- Shock
- RSTD

**VT-9008 and VT-9016**

- Random
- Sine
- Shock
- Resonance Search Track & Dwell (RSTD)
- Sine on Random (SoR)
- Random on Random (RoR)
- Sine and Random on Random (SRoR)
- Shock Response Spectrum (SRS)
- Transient Time History (TTH)
- Long Time History for Road Simulation (LTH)
- Vibro-Shock

**Other applications (optional)**

- Waveform Editor
- Channel Limit Spectrum Control
- COLA Output
- Multi-channel Control
- Kurtosis Control (Random / ROR)
- Step Test (Sine / RSTD)
- Harmonic Distortion Detection (Sine / RSTD)
- SRS Analysis (Shock / TTH)
- Higher Analysis Frequency of Random Test (Up to 18.75 kHz, SOR and ROR up to 9375 Hz)
- Higher Analysis Lines of Random Test (Up to 6400 Lines)
- Higher Frequency of Sine Test (Sine / RSTD Up to 10 kHz)
- Lower Frequency of Sine Test (Sine / RSTD Low to 0.01Hz)
- Digital I/O interface
- Automatically Obtain TEDS Information
- Self-calibration
- Offline View
- MATLAB Interface

**Random**

**Control Methods**

Control loop	PSD control method of Gaussian random signal, patented adaptive control algorithm with frequency response equalization and updating. System can accurately and quickly compensate for non-linear and time varying changes in the dynamic load. Continuous Gaussian random signal
Drive signal	

**Performance**

Dynamic Range	> 90 dB
Control accuracy	Within ±1 dB
Loop time	Equal to the linear average of the frame time, typical 100 ms
Security Checks	Each frame

**Parameters**

Frequency ranges	DC to 4680 Hz, up to 18750 Hz
Frequency resolution	100, 200, 400, 800, 1600, 3200, up to 6400 lines
Control strategy	Single channel control, multi-channel control (Weighted Average, Minimum, Maximum)
Degrees of freedom	4 to 1200
Drive clipping	2 to 6 Sigma
FRF	Obtain from pre-test or import the pre-stored FRF

**Random**

Profiles

- Breakpoint Breakpoint table with unlimited combination of PSD levels with slope (dB / octave) at user-defined frequencies
- Calculation Auto-calculates the value of crossover frequency, auto-check the validity of defined Breakpoint
- Alarm/Abort High and low profile limits specified at each breakpoint in dB with respect to reference. RMS high and low limits calculated automatically from profile or defined by user Auto-calculated or manual set
- Profile view Profile graphics are shown and updated after created. Automatic listing of RMS acceleration and displacement values for profile. Profile operating levels are compared to the shaker parameter table

Commands

- Control commands Start, Stop, Pause, Continue
- Level commands Set Level, Increase Level, Decrease Level, Resume Schedule Level
- Process commands Next Event, Next Profile
- Other commands Start/Stop Preview, Open/Close Control Loop, Enable/Disable Abort Check, Continue/Pause Schedule Clock

Schedule

- Level Test Set Level and time
- Start/End Loop Set Loop time and Loop Start/Stop
- Abort Check Enable and Disable Abort Check
- Loop Control Open/Close Loop
- Pause Set the condition of Continue
- Test Report Automatically generate reports based on user-defined
- Save Auto-save Pane, Screen, or Signals
- Run Flow Chart Support up to 6 Profiles

Safety

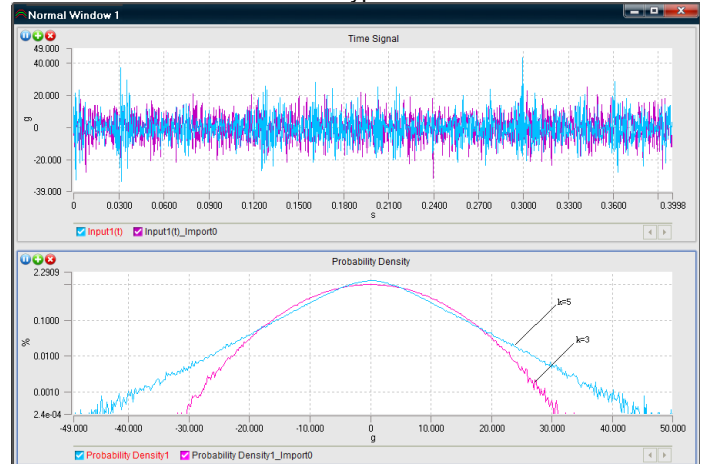
- Shaker Limit Max. Acceleration, Velocity, Displacement and Force limit
- Channel Limit Notching, RMS limit
- RMS Abort Each channel can set abort value
- Input channel Auto-check Open-loop and Overload
- Over-limit Check Line Alarm/Abort check, Line Alarm/Abort ratio range: 0 to 100%
- Drive Limit User-defined Drive Limit Voltage
- Abort Rate User-defined
- Abort User Stop command, Abort button

New Features

Kurtosis control (optional)

Adjust random signal amplitude distribution, support for super-Gaussian or sub-Gaussian stochastic control.

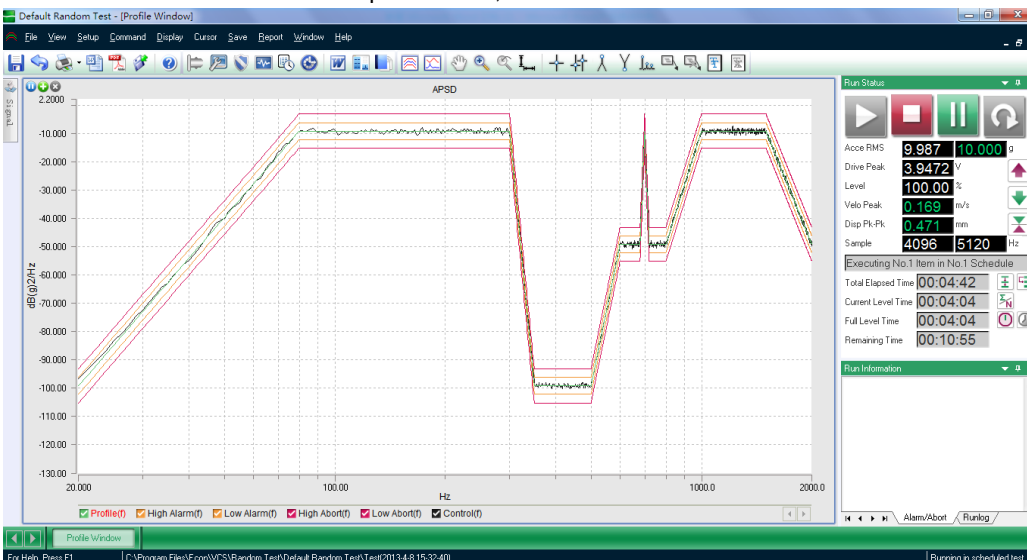
Kurtosis 2 to 7 typical



Channel RMS Abort

Each channel can set RMS Abort value to protect the article.

Input Channel	Output Channel	Channel Limit	Input Type	Range (V)	Weighting	Couple	TEBS	Transducer	Sensitivity	Unit	Polarity	Offset (V)	Charge (mV/g)	Status	Amplifier	Enable	Value	Unit
1	Control	10	1.000	AC Dif	OK	Acceleration	100	mV/g	Pos	0	OFF	OFF	10	ε				
2	Monitor	10	0.000	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	OFF	10	ε				
3	Monitor	10	0.000	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	OFF	10	ε				
4	Monitor	10	0.000	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	OFF	10	ε				
5	Monitor	10	0.000	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	OFF	10	ε				
6	Monitor	10	0.000	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	OFF	10	ε				
7	Monitor	10	0.000	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	OFF	10	ε				
8	Monitor	10	0.000	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	OFF	10	ε				



**Sine on Random**

**Test Parameters**

Parameters of the Sine on Random are the same with Random.

Frequency ranges 0 to 4680 Hz (DC), up to 9375 Hz  
 Frequency resolution 400, 800, 1600, 3200  
 Drive signal Continuous Gaussian random signal plus Sine Tone

**Schedule**

Sine Signal up to 12, each one is independent and can be turned on / off  
 Random Broadband Can be turned on / off

**Safety**

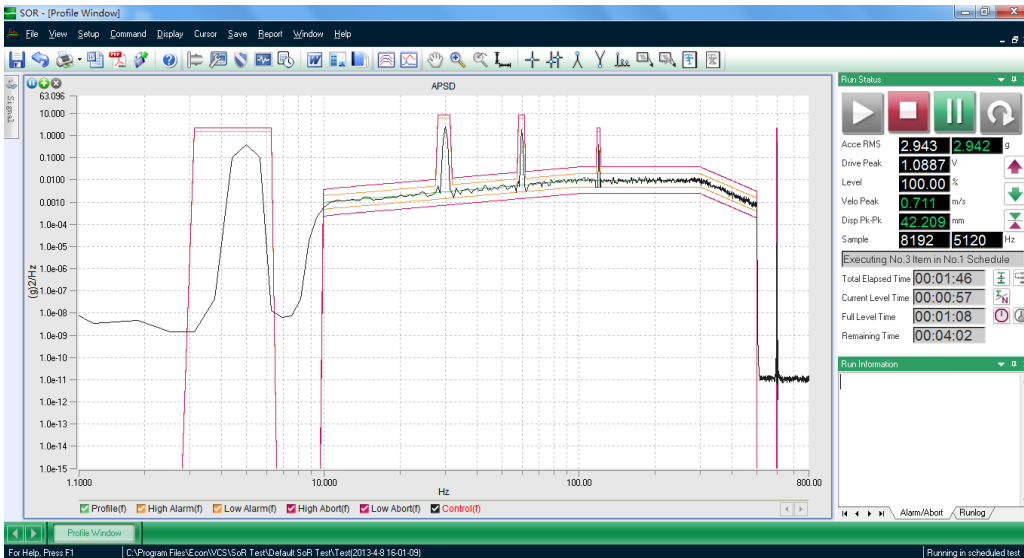
Shaker Limit Max. Acceleration, Velocity, Displacement and Force limit  
 Channel Limit Notching, user defined profile

**Sine Tone**

Type Dwell, Sweep, up to 12 sine signals  
 Level Constant A, V, D or user-defined profile  
 Frequency ranges Frequency of Sweep and Dwell can be defined within the defined Max. frequency  
 Sweep Mode Linear or Log  
 Sweep Direction Up / Down  
 Burst On / Off, user defined time  
 Alarm/Abort Specified in dB with respect to reference  
 Harmonic Sweep Other Sine signal' frequency are integer multiples of Sine signal No.1

**New Features**

Within defined Max. Frequency, Sine Tone's frequency can be beyond Random Broadband.



**Random on Random**

**Test Parameters**

Parameters of the Random on Random are the same with Random.  
 Frequency ranges 0 to 4680 Hz (DC), up to 9375 Hz  
 Frequency resolution 400, 800, 1600, 3200  
 Drive signal Continuous Gaussian random signal plus Narrowbands

**Schedule**

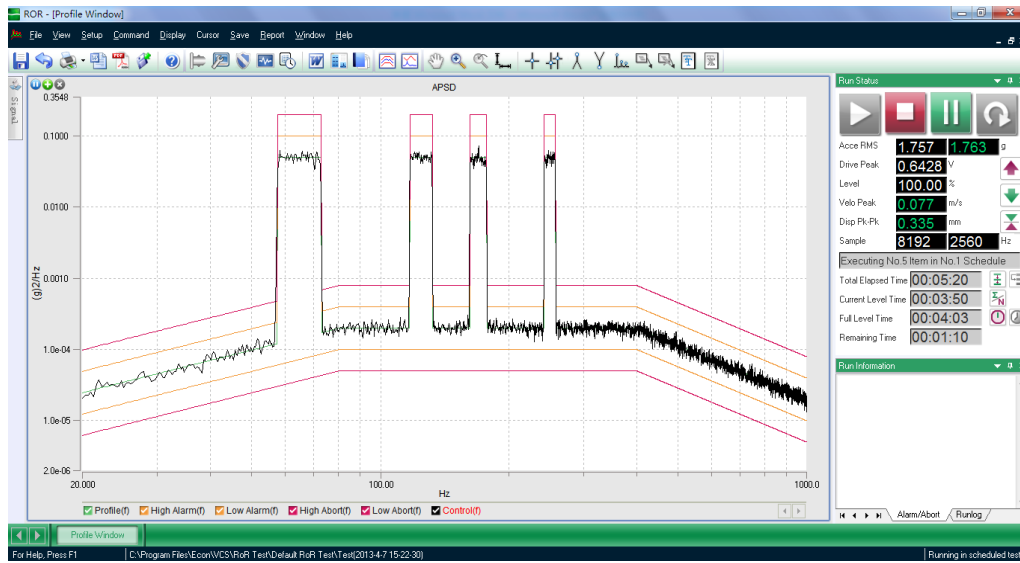
Narrowband up to 12, each one is independent and can be turned on / off  
 Broadband Random Can be turned on / off

**Safety**

Shaker Limit Max. Acceleration, Velocity, Displacement and Force limit  
 Channel Limit Notching or RMS Limit

**Narrowbands**

Type Dwell, Sweep  
 Level Constant APSD or user-defined profile  
 Frequency ranges Frequency of Sweep and Dwell can be defined within the Broadband's Frequency  
 Bandwidth User defined  
 Sweep Mode Linear or Log  
 Sweep Direction Up/Down  
 Alarm/Abort Specified in dB with respect to reference  
 Harmonic Sweep Other Narrowbands' frequency are integer multiples of Narrowband No.1  
 Summation Sum or The Maximal Value



**Sine and Random on Random**

**Test Parameters**

Parameters of the Sine and Random on Random are the same with Random.

Frequency ranges 0 to 4680 Hz (DC), up to 9375 Hz  
 Frequency resolution 400, 800, 1600, 3200  
 Drive signal Continuous Gaussian random signal plus Sine Tone and Narrowbands

**Schedule**

Sine Tone up to 12, each one is independent and can be turned on / off  
 Narrowband up to 12, each one is independent and can be turned on / off  
 Broadband Random Can be turned on / off

**Safety**

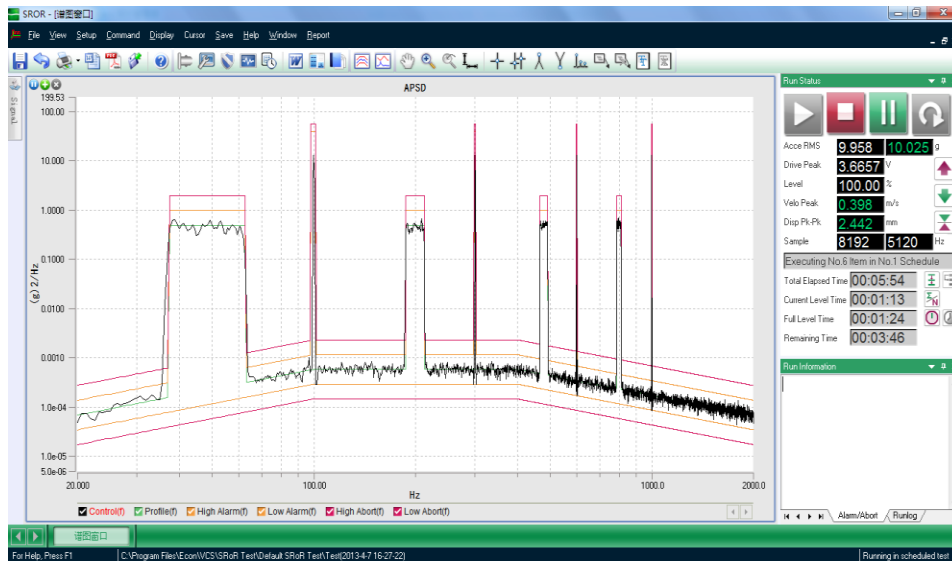
Shaker Limit Max. Acceleration, Velocity, Displacement and Force limit  
 Channel Limit Notching

**Sine Tone**

The same with Sine on Random.

**Narrowbands**

The same with Random on Random.





**Sine**

**Control Methods**

Control method Sine waveform amplitude control, adaptive control based on sine signal amplitude updating, can accurately and quickly compensate for non-linear and time varying changes in the dynamic load.

Drive Analog sine signal

**Control Performance**

Dynamic Range > 95 dB  
 Control accuracy Within ±1 dB  
 Loop time 5ms typically  
 Frequency accuracy 0.01%

**Control Parameters**

Frequency ranges 1 Hz to 5000 Hz, up to 10000Hz, Low frequency extension to 0.01Hz

Frequency resolution 512, 1024, 2048, 4096 lines

Control strategy Single channel control, multi-channel control (Weighted Average, Minimum, Maximum)

Sweep Mode Linear/Log

Tracking filters Proportional Bandwidth (7 to 100%) or Fixed Bandwidth

Box Tolerance Threshold and Alarm / Abort Width can be defined

THD Calculate total harmonic distortion between analysis frequency, and the order of the THD can be defined (optional)

**Profile**

Breakpoint Breakpoint table with unlimited combination of A, V, D levels with slope (dB / octave) at user defined frequencies

Calculated Auto-calculates the value of crossover frequency, auto-check the validity of defined Breakpoint

Alarm / Abort High and low profile limits specified at each breakpoint in dB with respect to reference.

Profile view Profile graphics are shown and updated after created. Automatic listing of RMS acceleration and displacement values for profile. Profile operating levels are compared to the shaker parameter table

Compression rate Define different compression rate for different frequency bands

Sweep rate Define different sweep rate for different frequency bands

**COLA output**

Waveform Type Constant amplitude sine or DC amplitude variation with frequency

**Commands**

Control commands Start, Stop, Pause, Continue

Level commands Set Level, Increase Level, Decrease Level, Resume Schedule Level

Frequency command Set frequency

Sweep commands Up/Down/Hold/Release, Set Sweep Rate, Resume Schedule Sweep Rate, Set Compress Rate, Resume Schedule Compress Rate

Process commands Next Event, Next Profile

Other commands Start/Stop Preview, Open/Close Control Loop, Enable/Disable Abort Check, Continue/Pause Schedule Clock

**Schedule**

Sweep Event Set Level, Frequency, Sweep rate, Compression rate, Sweep Direction and time

Resume Sweep Follow previous Sweep Event, Level, Low/High Frequency, Sweep rate, Compression rate, and time can be defined

Step Test Step sine dwell, the Step Size can be Linear/Log defined, and Sine turned on/off time also can be defined

Dwell Set Level, Frequency, Compression rate, and time

Resume Dwell Follow previous Dwell event, Level, Compression rate, and time can be defined

Start/End Loop Set Loop time and Loop Start/Stop

Abort Check Enable and Disable Abort Check

Loop Control Open/Close Loop

Pause Set the condition of Continue

Test Report Automatically generate reports based on user-defined

Save Auto-save Pane, Screen, or Signals

Run Flow Chart Support up to 6 Profiles

**Safety**

Shaker Limit Max. Acceleration, Velocity, Displacement and Force limit

Channel Limit Notching, user defined profile

Peak Abort Each channel can set abort value

Input channel Auto-check Open-loop and Overload

Over-limit Check Line Alarm/Abort check, Line Alarm/Abort ratio range: 0 to 100%

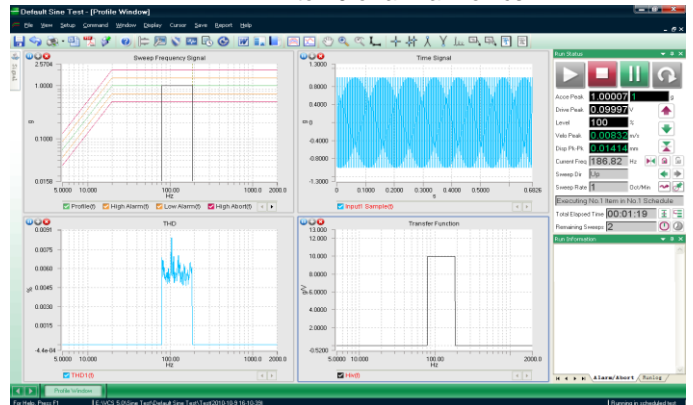
Drive Limit User-defined Drive Limit Voltage

Abort Rate User-defined

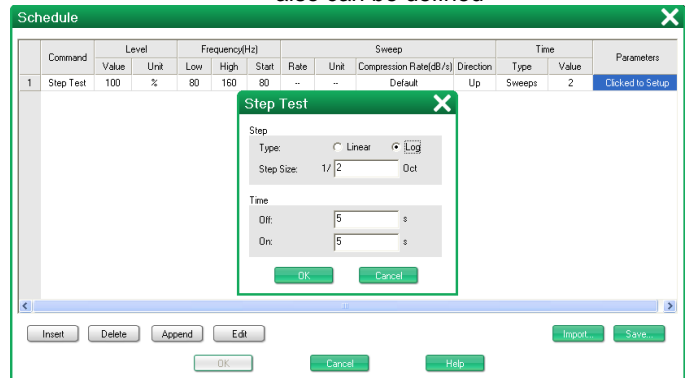
Abort User Stop command, Abort button

**New Features**

THD(Optional) User-defined harmonic order between 1 to 20 or all harmonics



Step Sine(Optional) The Step Size can be Linear/Log defined, and Sine turned on/off time also can be defined



Sine

New Features

Improved timing Time, Sweeps, Cycles

Command	Level	Frequency(Hz)	Sweep	Time	Parameters
Value	Unit	Low High Start	Rate Unit Compression Rate(dB/s) Direction	Type Value	
1 Sweep Event	100 %	80 2000 80	Default -- Default	Up Sweeps 2	--

Peak Abort Each channel can set abort value

Input Channel	Output Channel	Channel Limit	Input	Couple	TEDS	Transducer	Sensitivity	Unit	Polarity	Offset (V)	Charge (uV/gC)	Status	Applifier	Analyse	Abort (Peak)	Enable	Value	Unit	Name
1	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	Filter	ON	10	g	Input1						
2	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	Filter	OFF	10	g	Input2						
3	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	Filter	OFF	10	g	Input3						
4	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	Filter	OFF	10	g	Input4						
5	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	Filter	OFF	10	g	Input5						
6	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	Filter	OFF	10	g	Input6						
7	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	Filter	OFF	10	g	Input7						
8	AC Dif	OFF	Acceleration	100	mV/g	Pos	0	OFF	Filter	OFF	10	g	Input8						

Box-Tolerance

Allow you to modify the tolerance bands near a discontinuity segment that defined in Profile

Full-band defined Compression Ratio and Sweep Rate

**Resonance Search Track & Dwell (RSTD)**

**Test Parameters**

Parameters of the RSTD are the same with Sine.

**Resonance Search**

Search object      Transfer function between a pair of input channels or between input channel and control signal

Search range      Between user-defined Low Frequency and High Frequency

Sweep Mode      Linear / Log

Resonance identify      Based on Q (Quality factor) value or Amplitude Ratio of Transfer function

**Signal Display**

Curve display      Amplitude-frequency curve and Phase-frequency curve of transfer function

RSTD Note      Record RSTD information

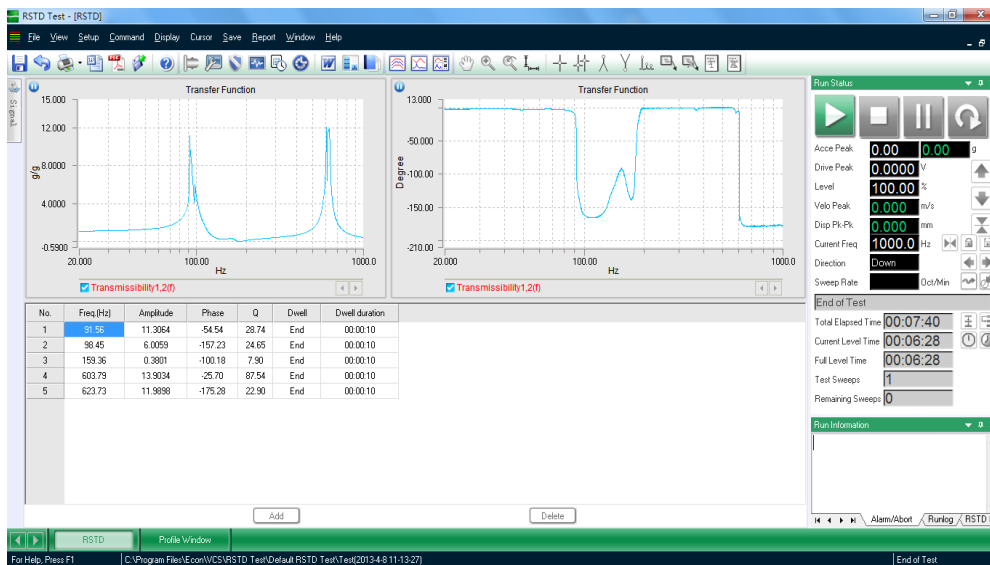
RSTD Window      Dwell table list the resonance point's frequency, Amplitude, Phase, Q value, Planned Dwell time and Dwell duration

**Dwell**

Search Mode      Dwell when Search for a resonant frequency or Dwell after finished Search

Dwell Mode      Frequency Locked Dwell/Resonance Track Dwell/Phase Track Dwell

Stop Dwell Conditions      Dwell Time, Dwell Sine Cycles, Amplitude Ratio Changing (dB), Resonant Frequency Changing, Phase Difference (Degree)



**Classical Shock**

**Control Parameters**

Pulse Interval Define the time interval between two pulses

Average Number 1 to 10

Low-pass Filter User-defined Cutoff Frequency

FRF Obtain from pre-test or import the pre-stored FRF

Block Size 256 to 16384

**Profile**

Pulse Types Half Sine, Initial Peak Saw-tooth, Final Peak Saw-tooth, Triangular, Rectangular, Trapezoid, Haversine

Pulse Duration 0.5ms to 3,000ms

Pulse Amplitude User-defined

Test Standard MIL-STD-810, ISO, User-defined

**Pulse Compensation**

Pulse Compensation Pre- and post-pulse, post-pulse only or pre-pulse only; single or double sides for minimum acceleration and fully use of shaker stroke

Pre- and Post- Amp. specified in % with respect to reference

**Commands**

Control commands Start, Stop, Pause, Continue

Level commands Set Level, Increase Level, Decrease Level, Resume Schedule Level

Pulse commands Single/Positive/Negative Pulse

Process command Next Event

Other commands Open/Close Control Loop, Enable/Disable Abort Check, Auto/Manual Mode

**Schedule**

Level Test Set Level and Pulses

Start/End Loop Set Loop time and Loop Start/Stop

Abort Check Enable and Disable Abort Check

Loop Control Open/Close Loop

Reverse Pulse Invert Pulse in shape

Run Mode Auto/Manual Mode

Test Report Automatically generate reports based on user-defined

Save Auto-save Pane, Screen, or Signals

**Safety**

Shaker Limit Max. Acceleration, Velocity, Displacement and Force limit

RMS Abort Each channel can set abort value

Input channel Auto-check Open-loop and Overload

Over-limit Check Line Alarm/Abort check, Point Alarm/Abort ratio range: 0 to 100%

Drive Limit User-defined Drive Limit Voltage

Abort Rate User-defined

Abort User Stop command, Abort button

**New Features**

**SRS Analysis (optional)**

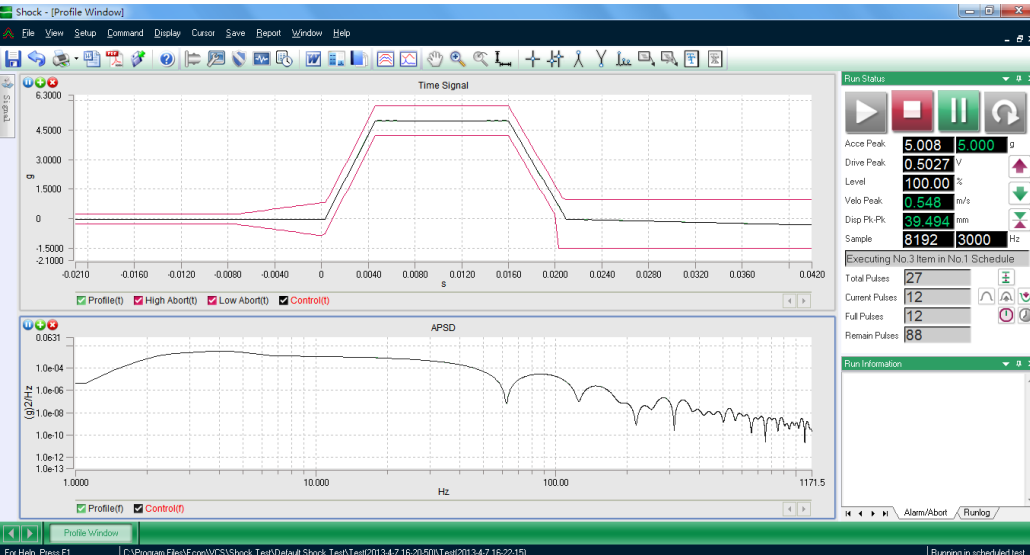
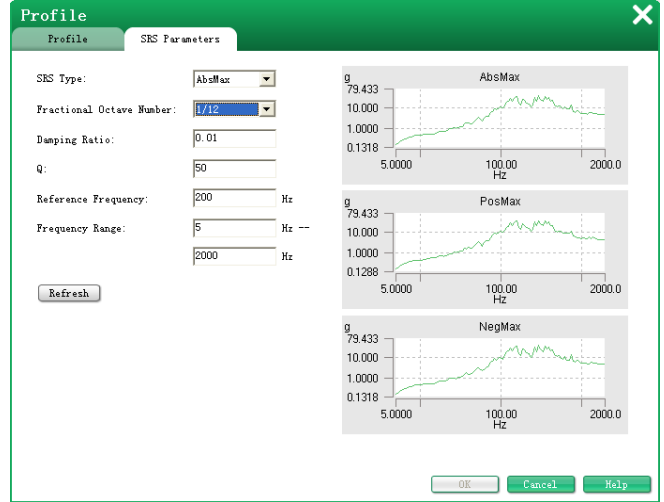
SRS Type Max. Absolute, Max. Positive, Max. Negative

Frequency Range User defined Frequency Range and Reference Frequency

Fractional Octave 1/1, 1/3, 1/6, 1/12, 1/24, 1/48

Q Value User-defined, relate with Damping Ratio

Damping Ratio User-defined, relate with Q Value



**Shock Response Spectrum**

**Control Parameters**

Pulse Interval	Define the time interval between two pulses
Average Number	1 to 10
FRF	Obtain from pre-test or import the pre-stored FRF
Block Size	Up to 16384
Sampling Frequency	up to 48000 Hz
<b>Profile</b>	
Break point	Breakpoint table with unlimited combination of Acceleration levels with slope (dB/octave) at user defined frequencies
Calculated	Auto-calculates the value of crossover frequency, auto-check the validity of defined Break point
Alarm/Abort	High and low profile limits specified at each breakpoint in dB with respect to reference.
Profile view	Profile graphics shown and updated as profile is created. Automatic listing of RMS acceleration and displacement values for profile. Profile operating levels are compared to the shaker parameter table

**Analysis Parameters**

SRS Type	Max. Absolute, Max. Positive, Max. Negative
Fractional Octave	1/1, 1/3, 1/6, 1/12, 1/24, 1/48
Damping Ratio	0.001 to 0.999999
Pulse Compensation	DC Remove, High Pass Filter

**Waveform Synthesis**

Wavelet Window	Sine, Exponential, Hanning, Rectangle
Reduce Factor	1, 2, 4, 8, 12
Synthesis Type	Auto, User Defined Duration
Wavelet Parameters	Frequency, Amplitude, Delay, Half Cycles, Demand Amplitude, Synthesized Amplitude
Wavelet Optimize	One Step, Auto Optimize
Signal View	Profile, SRS, Error, Acceleration, Velocity, Displacement

**Commands**

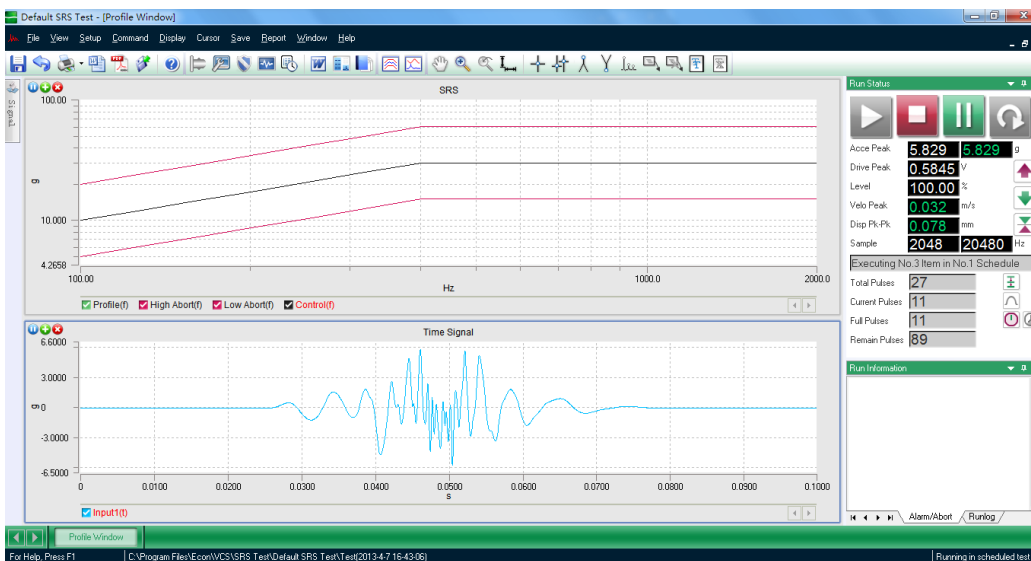
Control commands	Start, Stop, Pause, Continue
Level commands	Set Level, Increase Level, Decrease Level, Resume Schedule Level
Pulse command	Single Pulse
Process command	Next Event
Other commands	Open/Close Control Loop, Enable/Disable Abort Check, Auto/Manual Mode

**Schedule**

Level Test	Set Level and Pulses
Start/End Loop	Set Loop time and Loop Start/Stop
Abort Check	Enable and Disable Abort Check
Loop Control	Open/Close Loop
Run Mode	Auto/Manual Mode
Test Report	Automatically generate reports based on user-defined
Save	Auto-save Pane, Screen, or Signals

**Safety**

Shaker Limit	Max. Acceleration, Velocity, Displacement and Force limit
RMS Abort	Each channel can set abort value
Input channel	Auto-check Open-loop and Overload
Over-limit Check	Line Alarm/Abort check, Point Alarm/Abort ratio range: 0 to 100%
Drive Limit	User-defined Drive Limit Voltage
Abort Rate	User-defined
Abort	User Stop command, Abort button



**Transient Time History**

**Control Parameters**

Pulse Interval Define the time interval between two pulses

Average Number 1 to 10

Low-pass Filter User-defined Cutoff Frequency

FRF Obtain from pre-test or import the pre-stored FRF

Block Size Up to 16384

**Profile**

Profile waveforms Sine, Beat, Chirp, White Noise, Test Data

Pre-stored Data Bellcore1, Bellcore2, Bellcore3

Import data format Support Binary, txt, UFF, Excel, Waveform Editor generated road data files (. cps)

Re-Sampling Sampling frequency up to 48 kHz

Modify Data Modify scale factor to adjust the amplitude or modify polarity of the waveform, or modify some of the data points values, or waveform interception

Window Hanning, ant the Front/Back Length can be defined

Pulse Compensation DC Remove, High Pass Filter

Abort Limit High / Low Abort Limit specified in acceleration

Profile view Profile graphics are shown and updated after created. Automatic listing of acceleration velocity and displacement values for profile. Profile operating levels are compared to the shaker parameter table

**Commands**

Control commands Start, Stop, Pause, Continue

Level commands Set Level, Increase Level, Decrease Level, Resume Schedule Level

Pulse commands Single/Positive/Negative Pulse

Process command Next Event

Other commands Open/Close Control Loop, Enable/Disable Abort Check, Auto/Manual Mode

**Schedule**

Level Test Set Level and Pulses

Start/End Loop Set Loop time and Loop Start/Stop

Abort Check Enable and Disable Abort Check

Loop Control Open/Close Loop

Reverse Pulse Invert Pulse in shape

Run Mode Auto/Manual Mode

Test Report Automatically generate reports based on user definition

Save Auto-save Pane, Screen, or Signals

**Safety**

Shaker Limit Max. Acceleration, Velocity, Displacement and Force limit

RMS Abort Each channel can set abort value

Input channel Auto-check Open-loop and Overload

Over-limit Check Line Alarm/Abort check, Point Alarm/Abort ratio range: 0 to 100%

Drive Limit User-defined Drive Limit Voltage

Abort Rate User-defined

Abort User Stop command, Abort button

**New Features**

**SRS Analysis (optional)**

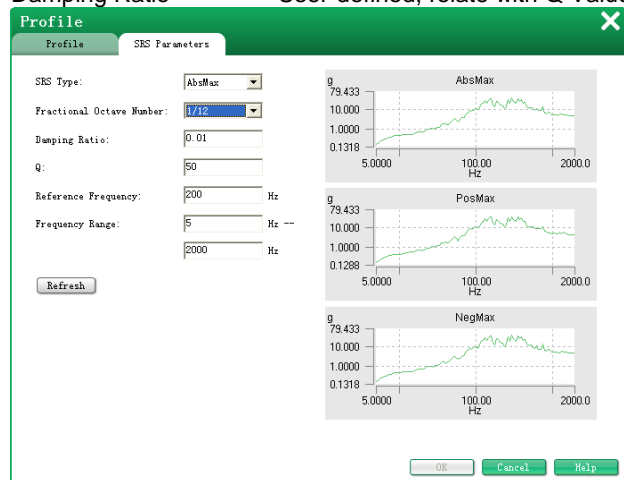
SRS Type Max. Absolute, Max. Positive, Max. Negative

Frequency Range User defined Frequency Range and Reference Frequency

Fractional Octave 1/1, 1/3, 1/6, 1/12, 1/24, 1/48

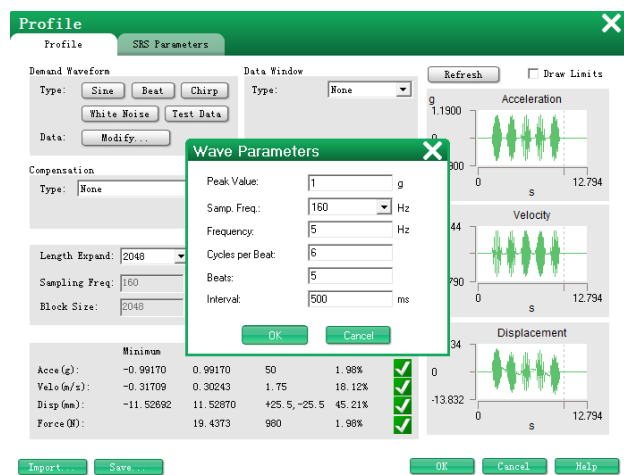
Q Value User-defined, relate with Damping Ratio

Damping Ratio User-defined, relate with Q Value

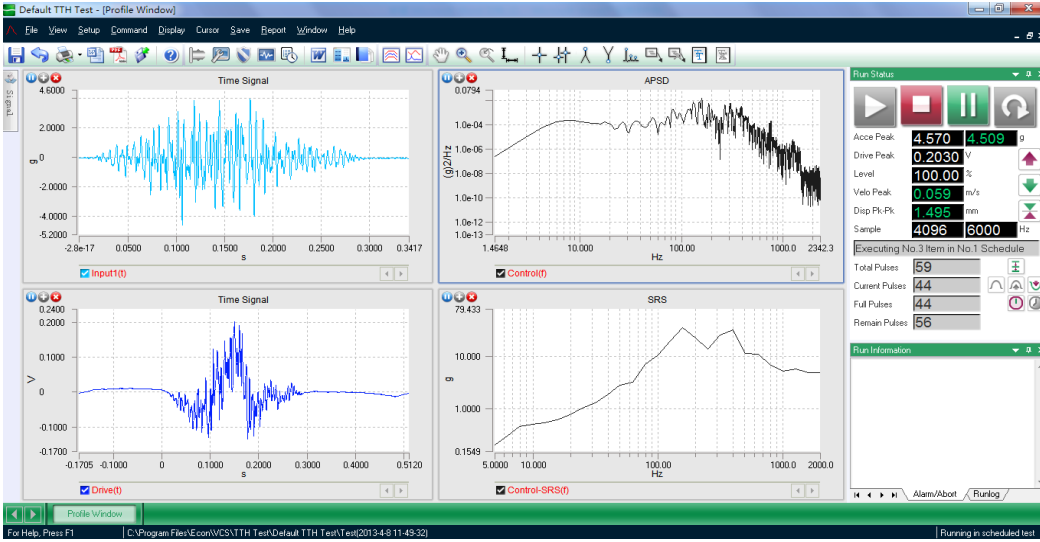


**Beat waveform**

Wave Parameters Peak Value, Sampling Frequency, Frequency, Cycles per Beat, Beats and Interval can be defined



**Transient Time History**



**Long Time History for Load**

**Control Methods**

Equalization method Low level random equalize transfer function

**Control Performance**

Control strategy Single channel control, multi-channel control (optional)

FRF Obtain from pre-test or import the pre-stored FRF

FRF Update Ratio 0 to 0.5

**Pre-test Profile**

Break point Breakpoint table with unlimited combination of APSD levels with slope (dB/octave) at user defined frequencies  
  
Calculated Auto-calculates the value of crossover frequency, auto-check the validity of defined Break point

**Profile**

Data sources Waveform Editor generated road data files (. cps)

Modify Data Modify scale factor to adjust the amplitude or modify polarity of the waveform

Abort Limit High/Low Abort Limit specified in acceleration

Frame Size 1024, 2048, 4096  
Duration From tens of milliseconds to several tens of hours, the longest time is related to sampling parameters

**Command**

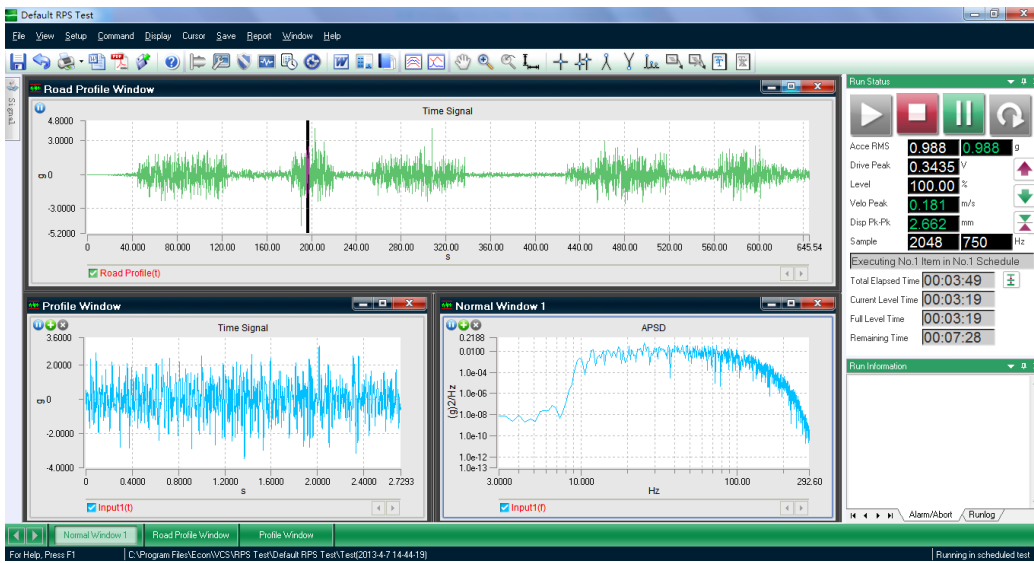
Control command Start, Stop, Pause, Continue  
Level command Set Level, Increase Level, Decrease Level, Resume Schedule Level  
Process command Next Event, Next Profile  
Other command Set FRF Update Ratio, Open/Close Control Loop, Enable/Disable Abort Check

**Schedule**

Level Test Set Level  
Start/End Loop Set Loop time and Loop Start/Stop  
Abort Check Enable and Disable Abort Check  
Loop Control Open/Close Loop  
Test Report Automatically generate reports based on user-defined  
Save Auto-save Pane, Screen, or Signals  
Run Flow Chart Support up to 6 Profiles

**Safety**

Shaker Limit Max. Acceleration, Velocity, Displacement and Force limit  
RMS Abort Each channel can set abort value  
Input channel Auto-check Open-loop and Overload  
Over-limit Check Line Alarm/Abort check, Line Alarm/Abort ratio range: 0 to 100%  
Drive Limit User-defined Drive Limit Voltage  
Abort Rate User-defined  
Abort User Stop command, Abort button





**Vibro-Shock**

**Control Methods**

Control loop PSD control method of Gaussian random signal, patented adaptive control algorithm with frequency response equalization and updating. Open-loop control of Random time domain signal cut-off by defined Shock Shape(full test)

Drive signal Continuous Gaussian random time domain signal Cut-off by defined Shock Shape

**Control Parameters**

Pulse Interval Define the time interval between two pulses

Control strategy Single channel control, multi-channel control (Weighted Average, Minimum, Maximum)

FRF Obtain from pre-test or import the pre-stored FRF

Frequency ranges 0 to 4680 Hz (DC), up to 18750 Hz

Frequency resolution 100, 200, 400, 800, 1600, 3200, up to 6400 lines

Degrees of freedom 4 to 1200

Drive clipping 2 to 6 Sigma

Block Size 256 to 16384

**Control Performance**

Dynamic Range > 90 dB

Security Checks Each frame

**Profile**

Breakpoint Breakpoint table with unlimited combination of PSD levels with slope (dB / octave) at user defined frequencies

Calculation Auto-calculates the value of crossover frequency, auto-check the validity of defined Break point

Alarm / Abort High and low profile limits specified at each breakpoint in dB with respect to reference. RMS high and low limits calculated automatically from profile or defined by user Auto-calculated or manual set

Profile view Profile graphics are shown and updated after created. Automatic listing of RMS acceleration and displacement values for profile. Profile operating levels are compared to the shaker parameter table

**Commands**

Control commands Start, Stop, Pause, Continue

Level commands Set Level, Increase Level, Decrease Level, Resume Schedule Level

Process command Next Event

Other commands Enable/Disable Abort Check, Reset Averaging

**Schedule**

Level Test Set Level and time

Start/End Loop Set Loop time and Loop Start/Stop

Abort Check Enable and Disable Abort Check

Test Report Automatically generate reports based on user-defined

Save Auto-save Pane, Screen, or Signals

**Shape Profile**

Calculation Cut-off random time domain signal based on time setting to control the output

Slope Linear/Log

**History Signal**

Block size 2048, 4096, 8192, 16384, 32768

Resolutions 8 to 128

Oscilloscope Points 128, 256, 512, 1024, 2048, 4096

**Safety**

Shaker Limit Max. Acceleration, Velocity, Displacement and Force limit

RMS Abort Each channel can set abort value

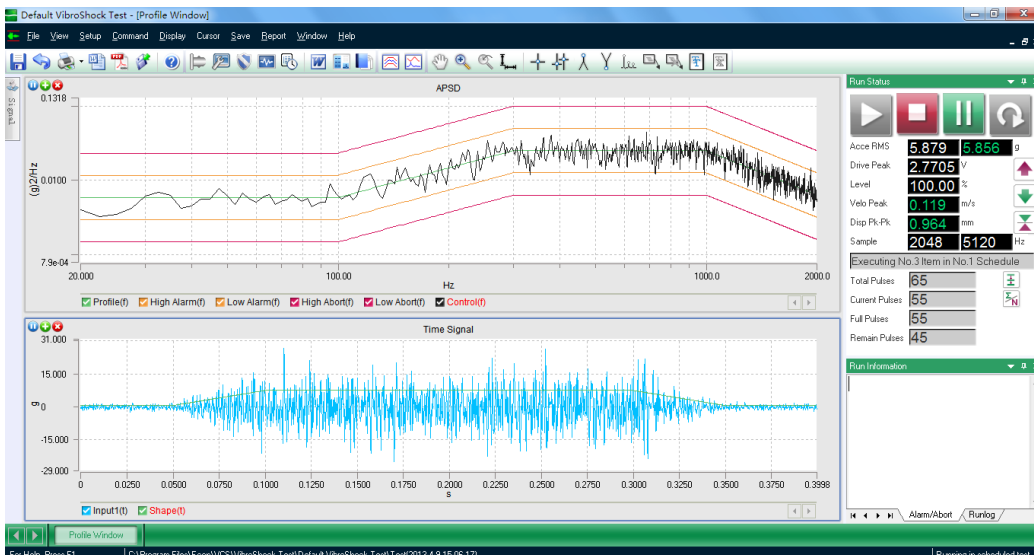
Input channel Auto-check Open-loop and Overload

Over-limit Check Line Alarm/Abort check, Line Alarm/Abort ratio range: 0 to 100%

Drive Limit User-defined Drive Limit Voltage

Abort Rate User-defined

Abort User Stop command, Abort button



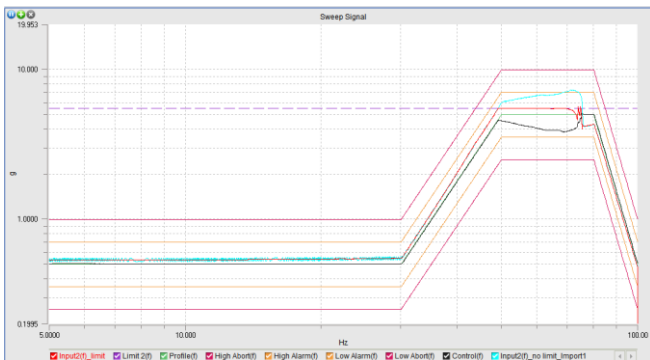
**Other Applications**

Waveform Editor

Waveform Type	Sine, White Noise, Chirp, Band-Limited Random or import data
Import data format	txt, UFF, csv files, ECON data records (. dar), road profile file (. cps)
Digital resampling	20Hz to 48000Hz
Limiting parameters	The Max. Positive and Negative Displacement, Max. Velocity, Max. Acceleration
Resolution	200,400,800,1600
Data Splice	Overlapping, Data Window
Compensation	Acceleration DC remove, Velocity DC remove, High Pass Filter, Low Pass Filter
Amplitude Adjustment	Modify scale factor to adjust the amplitude or modify polarity of the waveform
Editing method	Copy, Paste, Delete, Undo

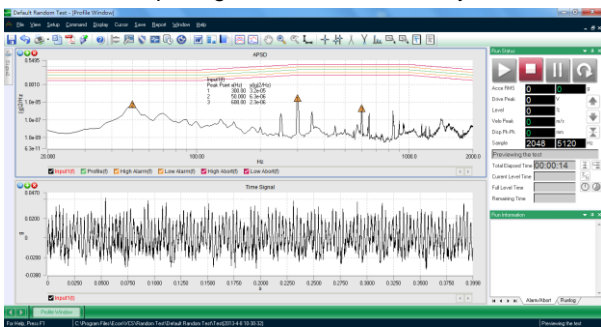
Channel Limit Spectrum Control (optional)

Including RMS limit and Notching to protect article.



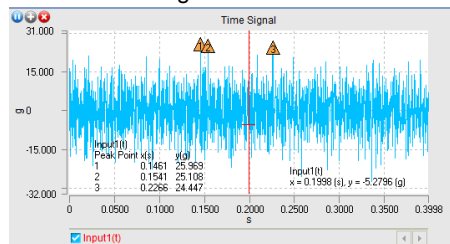
Preview

Preview test is an effective tool for system detection. Controller only does data acquisition and not output waveform. You can observe the input signal to determine the system characteristics.



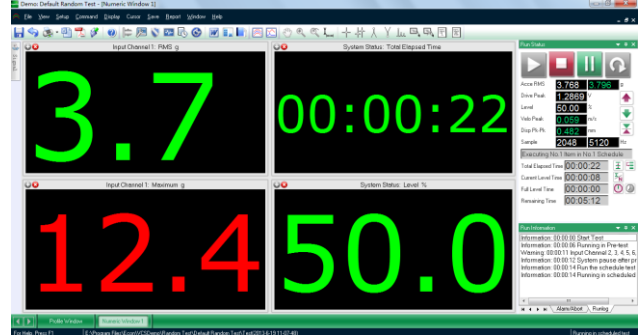
Data Display

Provides many kinds of windows to display different signals and each window can display multiple signals. Also, provides line cursor, band cursor, peak cursor, valley cursor and harmonic cursor to read signal values.



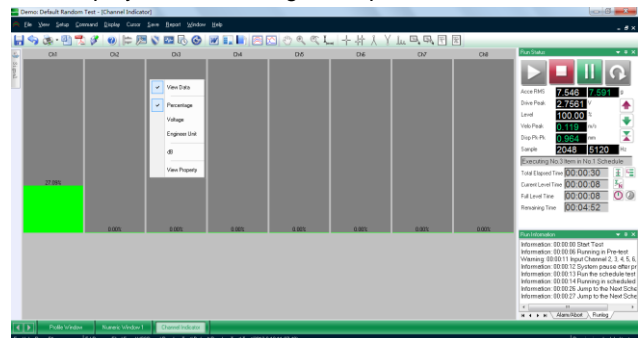
Value Display Window

Can display either channel characteristic values or system status.



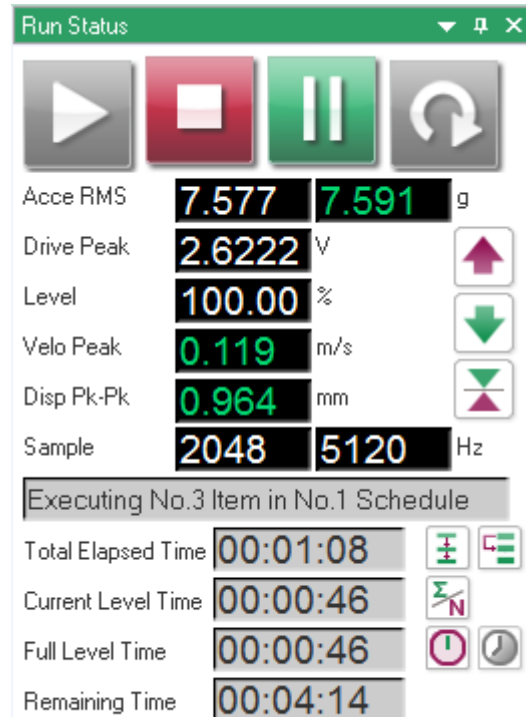
Channel Indicator Window

Can display channel voltage occupation.



Status Display

Real-time display test and operating states include control and demand acceleration RMS value (peak value), the Drive Voltage peak value, the Current Level, velocity Peak value, Displacement peak-peak value, etc.



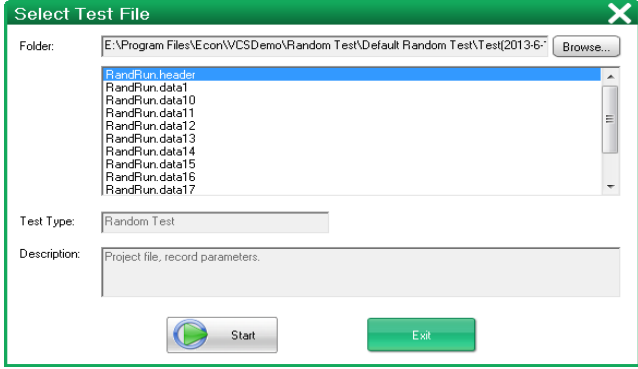
**Other Applications**

**Save Setting**

Auto/Manual/Schedule Save Signal, Pane, Screens and Offline data. Data format including Binary, txt and so on. Data can also export to other software freely, such as Excel.

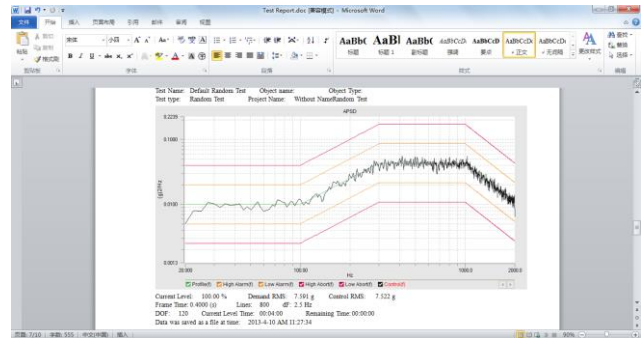
**Offline View**

To save test data when testing and playback then like a snapshot frame.



**Test Report**

Automatically generate test reports in Word or PDF format, or you can preview the report and print reports directly.



**MATLAB Interface**

Provides tools for importing data into the MATLAB software which superb engineering computation and numerical analysis functions are available.

**Ordering Guide**

WWW.FRANKBACON.COM

**UCON Vibration Controller Hardware**

Item	Part No.	Description
1	VT-9002-1	1 Channel UCON Controller
2	VT-9002-2	2 Channel UCON Controller
3	VT-9008-2	2 Channel UCON Controller
4	VT-9008-4	4 Channel UCON Controller
5	VT-9008-8	8 Channel UCON Controller
6	VT-9016-10	10 Channel UCON Controller
7	VT-9016-12	12 Channel UCON Controller
8	VT-9016-16	16 Channel UCON Controller
9	VT-90EX01	Enable one extra analog input channel to existing controller
10	VT-90EX02	Enable one extra analog input channel to existing controller
11	VT-90EX03	Emergency Stop Switch with 10 meters cable.
12	ACC-9000	Accessories (1 pcs/copy for each system)

**UCON Vibration Controller Application Software**

1	9801	Random Control
2	9801-01	Random frequency extension to 18,750 Hz
3	9801-02	Random higher resolution lines extension to 6,400 lines
4	9801-03	Kurtosis Control
5	9801-04	Sine on Random Control
6	9801-05	Random on Random Control
7	9801-06	Sine and Random on Random Control
8	9802	Sine Control
9	9802-01	Step Sine Control
10	9802-02	Resonance Search, Track and Dwell Control (RSTD)
11	9802-03	Sine Frequency Extension low to 0.01 Hz
12	9802-04	Sine Frequency Extension high to 10,000 Hz
13	9802-05	THD Detection
14	9803	Classical Shock Control
15	9804	Shock Response Spectrum Control
16	9805	Transient Time History Control (FDR-TTH)
17	9805-01	Shock Response Spectrum Analysis
18	9806	Road Simulation Control (FDR-LTH)
19	9807	Vibro-shock Control

## About Us

ECON is a leading designer and manufacturer of instruments and equipment for test and measurement, headquartered in Hangzhou, China.

With more than 10 years experiences, ECON is a comprehensive solution supplier for Vibration Test, Vibration and Noise Measurement and Analysis, Structural Model Test, Transducer Calibration, and Environmental Reliability Test. Frank Bacon Machinery Sales Co. is a distributor for all ECON products

- Leading role in design and manufacturing of instrument and equipment for test and measurement in China
- A global sales and marketing network.
- Over 2,000 instruments installed worldwide: China-Mainland, Taiwan, Europe, USA, Russia, Mid-east, India, Korea, Japan……
- Customers among Aerospace, Aviation, Automotive, Electronics, IT & Computers, Packaging, transportation, Institutes and Universities……
- 70 employees, with an experienced and innovative R&D Team.
- A subsidiary company specialized in environmental test service

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**Website: [www.frankbacon.com](http://www.frankbacon.com)**

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