



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	Ye	es			
Dimensions						
Dimension (mm / in)	362×278×79 / 14.3×10.9×3.1	455×355×92 / 17.9×14.0×3.6	455×355×92 / 17.9×14.0×3.6			
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 sens	ing			
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 $^\circ \mathrm{C}$ $/$ 104 $^\circ \mathrm{F}$)				
PC Connections						
OS		Microsoft Windows XP / 7				
Interface		USB 2.0				



I / O Specifications

Output

Output Channels

Voltage Range

Output Impedance

Dynamic Range

Resolution

Output load

COLA) **Output Connectors** BNC ±10 VPEAK 24-bit DAC 30 Ω Max.30 mA PEAK 100 dB Reconstruction Filter 160 dB / Oct digital and analog filters 0.1 % (@1 kHz, 1 V_{input}) Amplitude accuracy Frequency accuracy 0.001 % Harmonic Distortion < -95 dB (@1 kHz, Fifth harmonic)

1 Drive and 1 COLA (VT-9002 without

Input Input Channels

Input Connectors Input Range Max. input Resolution Input Impedance Dynamic Range Anti-aliasing Filter Coupling IEPE power supply Amplitude accuracy **Frequency Accuracy** Harmonic Distortion Channel match Amplitude Phase SNR **Channel Crosstalk** < -105dB

2 to 16 BNC $\pm 10 V_{PEAK}$ ± 36 VPEAK 24-bit ADC 220 kΩ 110 dB Analog Anti-aliasing Filter and digital filter, Stop band attenuation greater than160 dB / Oct AC, DC, IEPE, TEDS (optional), charge(VT-9002, VT-9008) +24 V / +4 mA 0.5 % (@1 kHz, 1 Vinput) 0.001 % < -100dB (@1 kHz, Fifth harmonic) ±0.05 dB (DC ~ 20 kHz) ±0.5 Degree (DC ~ 20 kHz) 100 dB (@1 kHz, 1 Vinput) typical

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

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

Performance **Dynamic Range**

Drive signal

Control accuracy Loop time

Security Checks

> 90 dB Within ±1 dB Equal to the linear average of the frame time, typical 100 ms Each frame

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

Parameters

FRF

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) 4 to 1200 Degrees of freedom 2 to 6 Sigma Drive clipping 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 Level commands

Process commands Other commands

Schedule

Level Test Start/End Loop Abort Check Loop Control Pause Test Report

Save Run Flow Chart <u>Safety</u> Shaker Limit

Channel Limit RMS Abort Input channel Over-limit Check

Drive Limit Abort Rate Abort Continue/Pause Schedule Clock Set Level and time Set Loop time and Loop Start/Stop Enable and Disable Abort Check Open/Close Loop Set the condition of Continue Automatically generate reports based on user-defined Auto-save Pane, Screen, or Signals Support up to 6 Profiles

Start, Stop, Pause, Continue

Next Event, Next Profile

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

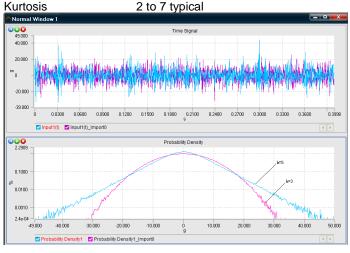
Start/Stop Preview, Open/Close Control Loop, Enable/Disable Abort Check,

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

New Features

Kurtosis control (optional)

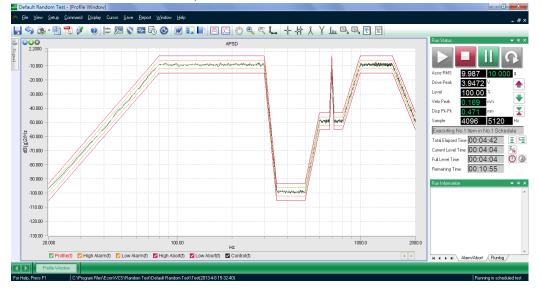
Adjust random signal amplitude distribution, support for super-Gaussian or sub-Gaussian stochastic control.



Channel RMS Abort

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

							Sensitiv	rity			Charg	e (nV/pC)	Ab	ort (BMS)
nput	Type	lange (V)	Weighting	Couple	TEDS	Transducer	Sensitivity		Polarity	Offset (V)		Amplifier	Enable	Value	Unit
1	Control	10	1.000	AC Dif	ON	Acceleration	100	n¥/ (g)	Pos	0	OFF		ON	10	ε
2	llonitor	10	0.000	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		OFF	10	£
3	Honi tor	10	0.000	AC Dif	OFF	Acceleration	100	n¥/ (g)	Pos	0	OFF		OFF	10	ε
4	Nonitor	10	0.000	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		OFF	10	ε
5	Honitor	10	0.000	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		OFF	10	E
6	Nonitor	10	0.000	AC Dif	OFF	Acceleration	100	n¥/ (g)	Pos	0	OFF		OFF	10	ε
7	Nonitor	10	0.000	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		OFF	10	б
8	Honi tor	10	0.000	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		OFF	10	ε
•							111								





Sine on Random

Test Parameters

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

Frequency ranges Frequency resolution Drive signal

Sine Signal

Random Broadband <u>Safety</u> Shaker Limit

Channel Limit

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

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

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

Sine Tone

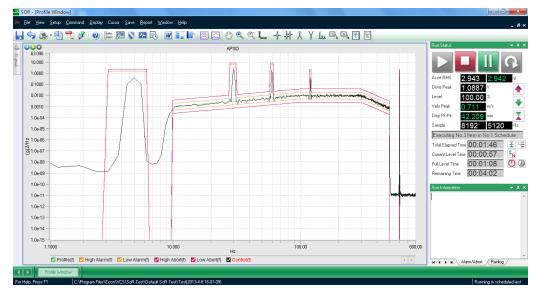
Type Level Frequency ranges

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

Harmonic Sweep

New Features

Within defined Max. Frequency, Sine Tone's frequency can 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

400, 800, 1600, 3200

plus Narrowbands

Frequency resolution Drive signal

Schedule

Narrowband

Broadband Random Safety Shaker Limit

Channel Limit

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

Continuous Gaussian random signal

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

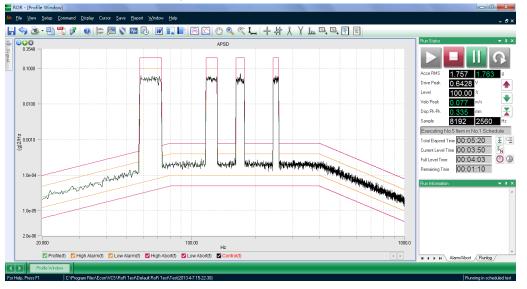


Type Level Frequency ranges

Bandwidth Sweep Mode Sweep Direction Alarm/Abort Harmonic Sweep

Summation

Dwell, Sweep Constant APSD or user-defined profile Frequency of Sweep and Dwell can be defined within the Broadband's Frequency User defined Linear or Log Up/Down Specified in dB with respect to reference Other Narrowbands' frequency are integer multiples of Narrowband No.1 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 Frequency resolution Drive signal 0 to 4680 Hz (DC), up to 9375 Hz 400, 800, 1600, 3200 Continuous Gaussian random signal plus Sine Tone and Narrowbands

Schedule

Sine Tone

Narrowband

Broadband Random

up to 12, each one is independent and can be turned on / off up to 12, each one is independent and can be turned on / off Can be turned on / off Shaker Limit

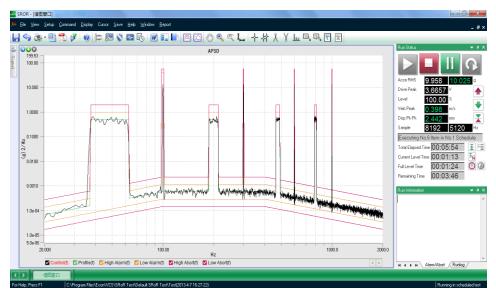
Channel Limit

Max. Acceleration, Velocity, Displacement and Force limit Notching

Sine Tone The same with Sine on Random.

Narrowbands

The same with Random on Random.





Sine		
Control Methods		Sche
Control method	Sine waveform amplitude control, adaptive control based on sine signal amplitude updating, can accurately and	Swee
	quickly compensate for non-linear and time varying changes in the dynamic load.	Resu
Drive	Analog sine signal	
Control Performance	<u>ce</u>	Step
Dynamic Range	> 95 dB	
Control accuracy Loop time	Within ±1 dB 5ms typically	Dwell
Frequency accuracy	0.01%	
Control Parameters	<u>.</u>	Resu
Frequency ranges	1 Hz to 5000 Hz, up to10000Hz, Low	
Frequency resolution	frequency extension to 0.01Hz 512, 1024, 2048, 4096 lines	Start/
Control strategy	Single channel control, multi-channel	Abort
	control (Weighted Average, Minimum,	Loop
	Maximum)	Paus Test F
Sweep Mode Tracking filters	Linear/Log Proportional Bandwidth (7 to 100%) or	16311
Tracking inters	Fixed Bandwidth	Save
Box Tolerance	Threshold and Alarm / Abort Width can	Run F
	be defined	Shake
THD	Calculate total harmonic distortion between analysis frequency, and the	Shak
	order of the THD can be defined	Chan
	(optional)	Peak
Profile		Input Over-
Breakpoint	Breakpoint table with unlimited combination of A, V, D levels	0,001
	with slope (dB / octave) at user defined	Drive
	frequencies	Abort Abort
Calculated	Auto-calculates the value of crossover frequency, auto-check the validity of	New
	defined Breakpoint	THD(
Alarm / Abort	High and low profile limits specified at	Dufault Sime 7
	each breakpoint in dB with respect to	Ele yes get
Profile view	reference. Profile graphics are shown and updated	25704
	after created. Automatic listing of RMS	
	acceleration and displacement values	0.1000
	for profile. Profile operating levels are compared to the shaker parameter table	0.0158
Compression rate	Define different compression rate for	
-	different frequency bands	0.0075
Sweep rate	Define different sweep rate for different frequency bands	0.0060
COLA output		0.0030
Waveform Type	Constant amplitude sine or DC	-4.4e-04 5.000
0	amplitude variation with frequency	For Help, Prezz F1
Commands	Start Stan Dauga Cantinua	Step
Level commands	Start, Stop, Pause, Continue Set Level, Increase Level, Decrease	
	Level, Resume Schedule Level	Schedu
Frequency command	Set frequency	Comr
Sweep commands	Up/Down/Hold/Release, Set Sweep Rate, Resume Schedule Sweep Rate,	1 Step
	Set Compress Rate, Resume Schedule	
. .	Compress Rate	
Process commands Other commands	Next Event, Next Profile Start/Stop Preview, Open/Close Control	
	Loop, Enable/Disable Abort Check,	
	Continue/Pause Schedule Clock	

Schedule

nequie	
eep Event	Set Level, Frequency, Sweep rate,
	Compression rate, Sweep Direction and time
sume Sweep	Follow previous Sweep Event, Level,
Sume Sweep	Low/High Frequency, Sweep rate,
	Compression rate, and time can be
	defined
p Test	Step sine dwell, the Step Size can be
•	Linear/Log defined, and Sine turned
	on/off time also can be defined
ell	Set Level, Frequency, Compression
	rate, and time
sume Dwell	Follow previous Dwell event, Level,
	Compression rate, and time can be
· · ·	defined
rt/End Loop	Set Loop time and Loop Start/Stop
ort Check	Enable and Disable Abort Check
op Control	Open/Close Loop
use st Report	Set the condition of Continue
кпероп	Automatically generate reports based on user-defined
ve	Auto-save Pane, Screen, or Signals
n Flow Chart	Support up to 6 Profiles
fety	
aker Limit	Max. Acceleration, Velocity,
	Displacement and Force limit
annel Limit	Notching, user defined profile
ak Abort	Each channel can set abort value
ut channel	Auto-check Open-loop and Overload
er-limit Check	Line Alarm/Abort check, Line
	Alarm/Abort ratio range: 0 to 100%
ve Limit	User-defined Drive Limit Voltage
ort Rate	User-defined
ort	User Stop command, Abort button
w Features	
D(Optional)	User-defined harmonic order between
It Sine Test - [Profile Window]	1 to 20 or all harmonics

Andere Desky Grace Serie Basics and Company and Company and Company and Company Company and Company and Company and Company Company and Company and Company and Company and Company and Company Company and Company Company and Compa 、「「十特 / / 「一回」[][0.8000 0.4000 -0.40 0.800 -1.300 0.2000 0.3000 0.4000 0.5000 0.1000 Hz 00:01:19 🗄 🖼 11.000 12.000 10.000 8.0000 J. ₹.0000 4.0000 2.0000 000 10.000 100.00 Hz 100.0

Step Sine(Option)

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

	Command	Le	vel	Fr	equency(Hz)			Sweep		Tin	e	Parameters
	Command	Value	Unit	Low	High	Start	Rate	Unit	Compression Rate(dB/s)	Direction	Туре	Value	Parameters
1	Step Test	100	%	80	160	80			Default	Up	Sweeps	2	Clicked to Setu
						Step	Test		×				
					- F				•••	1			
						Step							
						Type:		O L					
						Step	Size:	1/ 2	Oct				
						Time		_					
						Off:		5	\$				
						On:		5	\$				
									Cancel				
										J			
:								Ш					
	Insert	Delete	Ap	pend	Edi	:						Import.	Save



Sine

New Features

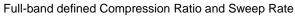
Command		svel	Fr	equency(i	Hz)			Sweep		Tim	ne	_	
	Value	Unit	Low/	High	Start	Rate	Unit	Compression Rate(dB/s)	Direction	Туре	Value	Parameters	
weep Event	100	%	80	2000	80	Default		Default	Up	Sweeps -	2		
										Sweeps Cycles			
	lete	Append) [OK	i dit		Cano		hannel c				mport Save	

	Couple		Transducer	Sensitiv	rity		yOffset (V)	Charg	e (nV/pC)	Analyse	Abo	rt (Peal	c)		
Input	Combie	TEUS	Iransducer	Sensitivity	Uni t	rorarit	yUIISet(V)	Status	Amplifier	Analyse	Enable	Value	Uni t		fane
1	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		Filter	ON	10	ε	Ir	uput1
2	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		Filter	OFF	10	g	Ir	iput2
3	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		Filter	OFF	10	ε	Ir	iput3
4	AC Dif	OFF	Acceleration	100	mV/ (g)	Pos	0	OFF		Filter	OFF	10	ε	Ir	iput4
5	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF	1	Filter	OFF	10	g	Ir	uput5
6	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		Filter	OFF	10	ε	Ir	
7	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		Filter	OFF	10	ε	Ir	uput7
8	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF	1	Filter	OFF	10	ε	In	
															P ato
															P 400
•	ead TEDS							11	1				-		ill Down

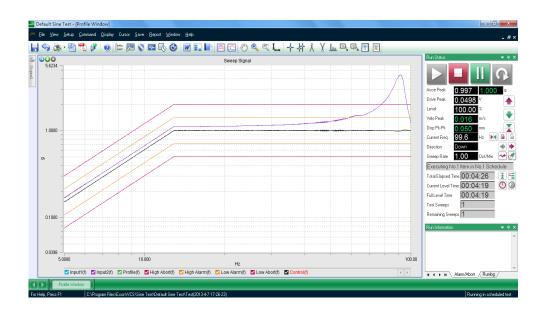
Box-Tolerance

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

Control Para	umeters		X	
🗌 Box Tolerance			Filter	
Threshold:	1	dB	Type: Proportional C Fixed	
Alarm Width:	0.1	Oct	Band Width: 25 💌 %	
Abort Width:	0.1	Oct	THD: All 💌	
🗌 Enable Resume	e from Abort			
	ОК		Cancel	



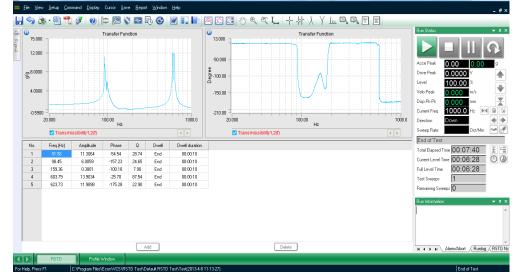
Pı	rofi	le									×
s	Sweep P	rofile	Speed/Co	mpress							
									Oct/Min	Oursen Data	
			rt Point		d Point	Unit			1.2000	Sweep Rate	
		Freq.(Hz)	-		Sweep Rate						
	1	5	1	2000	1	Oct/Min			1.0000 -		-
									0.8000	100.00	
									5.0000	100.00 Hz	2000.0
	Remi	ur Speed:	1	Oct/Min			Inser	_	Delete	Append Refr	
	vefore	n Speed.	1.	UCU/MIN			Tuzer		Derece	Append Nerr	esn
								_			_
		\$	Start Point		End Poin	ıt	Unit		dB/s 62.000	Compression Rate	
		Freq.(Hz)	Compression			ssion Rate					
	1	5	60	2	000	60	dB/s		60.000 -		<u> </u>
									58.000		÷-
									5.0000	100.00 Hz	2000.0
	Peml		ss Rate: 60		dB/s		Inser	_	Delete	Append Refr	
	vefore	r compre	ss nave. joo		w) s		Tuzer		Derece	Append Nerr	esn
In	nport	. Sav	e						OK	Cancel	Help





Resonance Search Track & Dwell (RSTD)

Test Parameters		<u>Dwell</u>	
Parameters of the RST	D are the same with Sine.	Search Mode	Dwell when Search for a resonant
Resonance Search	<u>1</u>		frequency or Dwell after finished Search
Search object	Transfer function between a pair of	Dwell Mode	Frequency Locked Dwell/Resonance Track Dwell/Phase Track Dwell
	input channels or between input channel and control signal	Stop Dwell Conditions	Dwell Time, Dwell Sine Cycles,
Search range	Between user-defined Low Frequency and High Frequency		Amplitude Ratio Changing (dB), Resonant Frequency Changing, Phase
Sweep Mode	Linear / Log		Difference (Degree)
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		
RSTD Test - [RSTD]			x





Classical Shock

Control Parameters

Control Parameters	
Pulse Interval	Define t
	pulses
Average Number	1 to 10
Low-pass Filter	User-de
FRF	Obtain f
	pre-stor
Block Size	256 to 1
Profile	
Pulse Types	Half Sin
	Peak Sa

Pulse Duration Pulse Amplitude Test Standard

Pulse Compensation

Pulse Compensation

Pre- and Post- Amp

Commands Control commands

Level commands

Pulse commands Process commands Other commands

Schedule

Level Test Start/End Loop Abort Check Loop Control Reverse Pulse Run Mode Test Report

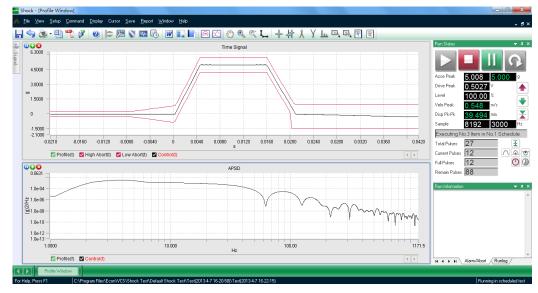
Save

	Define the time interval between two pulses	Sh
oer r	1 to 10 User-defined Cutoff Frequency Obtain from pre-test or import the pre-stored FRF	RM Inp Ov
	256 to 16384	Dri
le	Half Sine, Initial Peak Saw-tooth, Final Peak Saw-tooth, Triangular, Rectangular, Trapezoid, Haversine 0.5ms to 3,000ms User-defined	Ab Ab <u>Ne</u> SR
pensatio	MIL-STD-810, ISO, User-defined	Fre
Amp.	Pre- and post-pulse, post-pulse only or pre-pulse only; single or double sides for minimum acceleration and fully use of shaker stroke specified in % with respect to reference	Fra Q \ Da Pr
ands ds nds nand nds	Start, Stop, Pause, Continue Set Level, Increase Level, Decrease Level, Resume Schedule Level Single/Positive/Negative Pulse Next Event Open/Close Control Loop, Enable/Disable Abort Check, Auto/Manual Mode	S F D Q R F
	Set Level and Pulses	

Set Level and Pulses Set Loop time and Loop Start/Stop Enable and Disable Abort Check Open/Close Loop Invert Pulse in shape Auto/Manual Mode Automatically generate reports based on user-defined Auto-save Pane, Screen, or Signals

<u>Safety</u>

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 (op	tional)				
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				
Damping Ratio	User-defined, relate with Q Value				
Damping Ratio Profile Profile SES Parameters	User-defined, relate with Q Value				
Damping Ratio Profile Frofile SES Parameters SES Type: Absiliar	User-defined, relate with Q Value				
Damping Ratio Profile Profile SRS Parameters SRS Type: Practional Octave Number:	User-defined, relate with Q Value				
Damping Ratio Profile Profile SRS Type: Fractional Octave Number: Dumping Ratio: 0.01	User-defined, relate with Q Value				
Damping Ratio Profile Frofile SES Parameters SES Type: AbsHax Fractional Octave Number: [7/12 Damping Ratio: 0.01 0: 50	User-defined, relate with Q Value				
Damping Ratio Profile SKS Parameters SKS Type: Abdiax Fractional Octave Number: 1/12 Damping Ratio: 0.01 Q: 50 Reference Frequency: 200	User-defined, relate with Q Value				
Damping Ratio Profile Profile SKS Parameters SKS Type: Abdiax Practional Octave Number: [/12 Damping Ratio: 0.01 Q: 50 Reference Frequency: 200 Frequency Range: 5	User-defined, relate with Q Value				
Damping Ratio Profile Frofile SES Type: Abstlux Fractional Octave Number: 17/12 Dumping Ratio: 0.01 Q: 50 Reference Frequency: 200 Frequency Range: 5 2000	User-defined, relate with Q Value $ \begin{array}{c} $				
Damping Ratio Profile Frofile SES Type: Abstlux Fractional Octave Number: 17/12 Dumping Ratio: 0.01 Q: 50 Reference Frequency: 200 Frequency Range: 5 2000	User-defined, relate with Q Value $ \begin{array}{c} \end{array} $ $ \begin{array}{c} \end{array} $ $ \end{array} $ $ \end{array} $ $ \begin{array}{c} \end{array} $ $ \end{array} $ $ \end{array} $				
Damping Ratio Profile Frofile SES Type: Abstlux Fractional Octave Number: 17/12 Dumping Ratio: 0.01 Q: 50 Reference Frequency: 200 Frequency Range: 5 2000	User-defined, relate with Q Value R_{r} R_{r} R				
Damping Ratio Profile Frofile SES Type: Abstlux Fractional Octave Number: 17/12 Dumping Ratio: 0.01 Q: 50 Reference Frequency: 200 Frequency Range: 5 2000	User-defined, relate with Q Value $ \begin{array}{c} $				



OK Cancel Help



Shock Response Spectrum

Control Parameters

Control Parameters	<u>5</u>
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
Profile	
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 Paramete	
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,
May called Oration in a	Synthesized Amplitude
Wavelet Optimize	One Step, Auto Optimize
Signal View	Profile, SRS, Error, Acceleration,

Velocity, Displacement

Commands

Control commands Level commands Pulse command Process command Other commands

Schedule

Level Test Start/End Loop Abort Check Loop Control Run Mode Test Report

Save

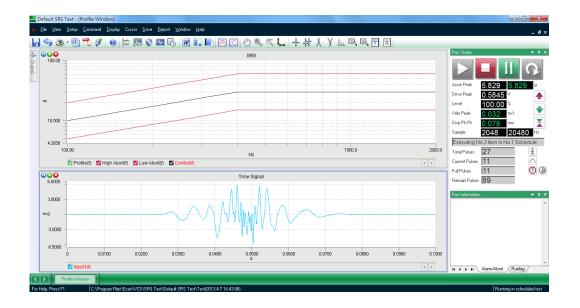
Shaker Limit

RMS Abort Input channel Over-limit Check

Drive Limit Abort Rate Abort Start, Stop, Pause, Continue Set Level, Increase Level, Decrease Level, Resume Schedule Level Single Pulse Next Event Open/Close Control Loop, Enable/Disable Abort Check, Auto/Manual Mode

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

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





Transient Time History

Control Parameters Pulse Interval

Average Number

Low-pass Filter FRF

Block Size Profile Destile

Profile waveforms

Pre-stored Data Import data format

Re-Sampling Modify Data

Window

Pulse Compensation Abort Limit

Profile view

Commands

Control commands Level commands

Pulse commands Process command Other commands

Schedule

Level Test Start/End Loop Abort Check Loop Control Reverse Pulse Run Mode Test Report

Save

Define the time interval between two pulses 1 to 10 User-defined Cutoff Frequency Obtain from pre-test or import the pre-stored FRF Up to 16384

Sine, Beat, Chirp, White Noise, Test Data

Bellcore1, Bellcore2, Bellcore3 Support Binary, txt, UFF, Excel, Waveform Editor generated road data files (. cps)

Sampling frequency up to 48 kHz Modify scale factor to adjust the amplitude or modify polarity of the waveform, or modify some of the data points values, or waveform interception Hanning, ant the Front/Back Length can be defined DC Remove, High Pass Filter High / Low Abort Limit specified in acceleration 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

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

Set Level and Pulses Set Loop time and Loop Start/Stop Enable and Disable Abort Check Open/Close Loop Invert Pulse in shape Auto/Manual Mode Automatically generate reports based on user definition Auto-save Pane, Screen, or Signals

Shaker Limit

Max. Acceleration, Velocity, **Displacement and Force limit RMS** Abort Each channel can set abort value Auto-check Open-loop and Overload Input channel Line Alarm/Abort check, Point **Over-limit Check** 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)

Max. Absolute, Max. Positive, Max. SRS Type Negative User defined Frequency Range and **Frequency Range Reference Frequency Fractional Octave** 1/1, 1/3, 1/6, 1/12, 1/24, 1/48 Q Value User-defined, relate with Damping Ratio User-defined, relate with Q Value Damping Ratio х SRS Parameters Profile AbsMax AbsMax -SRS Type g 79.433 10.000 Fractional Octave Number 1/12 -1.0000 0.01 Damping Ratio: 0.1318 5.0000 100.00 2000.0 50 Reference Frequency PosMax g 79.433 Frequency Range 10.000 2000 1.0000 Нz 0.1288 2000.0 5 0000 100.00 Refresh NegMax g 79.433 10.000 1.0000 0.1318 5 0000 100.00 2000.0

Beat waveform

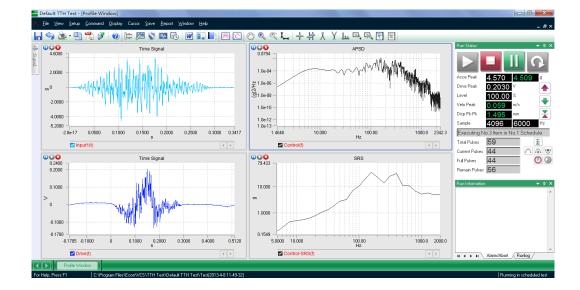
Wave Parameters

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

Profile Profile	SRS Parame	ters						×
	Beat Beat	Chirp T		None	•	Refresh 9 1.1900	Draw	Limits
Compensation Type: None		Wave Pau Peak Value: Samp. Freq.	1] 9] Hz		s	12.794
Length Expand:	2048 _	Frequency: Cycles per B	5 leat: 6	_	Hz	44	Velocity	_
Sampling Freq: Block Size:	160 2048	Beats: Interval:	5		ms	790 0	s	12.794
Acce (g):	Minimum -0.99170	0.99170	OK 50	Cancel		0 34	Displacement	
Velo(n/s): Disp(nn): Force(N):	-0.31709 -11.52692	0.30243 11.52870 19.4373	1.75 +25.5,-25.5 980	18.12% 45.21% 1.98%	V V	-13.832	s .	12.794
	ave					OK	Cancel	Help



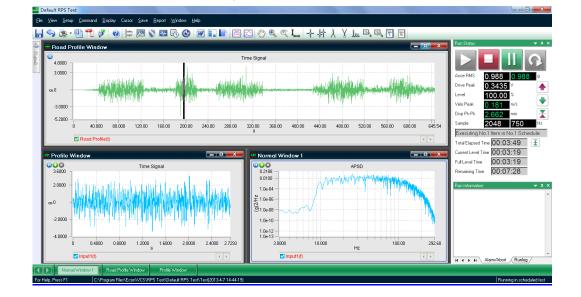
Transient Time History





Long Time History for Load

Control Methods		Command	
Equalization method	Low level random equalize transfer function	Control command Level command	Start, Stop, I Set Level, Iı
Control Performar	nce		Level, Resu
Control strategy	Single channel control, multi-channel control (optional)	Process command Other command	Next Event, Set FRF Up
FRF	Obtain from pre-test or import the pre-stored FRF		Control Loo Check
FRF Update Ratio	0 to 0.5	Schedule	
Pre-test Profile		Level Test	Set Level
Break point	Breakpoint table with unlimited	Start/End Loop	Set Loop tir
	combination of APSD levels with slope	Abort Check	Enable and
Calculated	(dB/octave) at user defined frequencies	Loop Control Test Report	Open/Close Automatical
Calculated	Auto-calculates the value of crossover	lest Kepoli	on user-defi
	frequency, auto-check the validity of defined Break point	Save	Auto-save
Profile		Run Flow Chart	Support up
Data sources	Waveform Editor generated road data	Safety	
	files (. cps)	Shaker Limit	Max. Accele
Modify Data	Modify scale factor to adjust the		Displaceme
-	amplitude or modify polarity of the	RMS Abort	Each channe
	waveform	Input channel	Auto-check
Abort Limit	High/Low Abort Limit specified in acceleration	Over-limit Check	Line Alarm/A Alarm/Abort
Frame Size	1024, 2048, 4096	Drive Limit	User-defined
Duration	From tens of milliseconds to several	Abort Rate	User-defined
	tens of hours, the longest time is related to sampling parameters	Abort	User Stop co



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

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

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

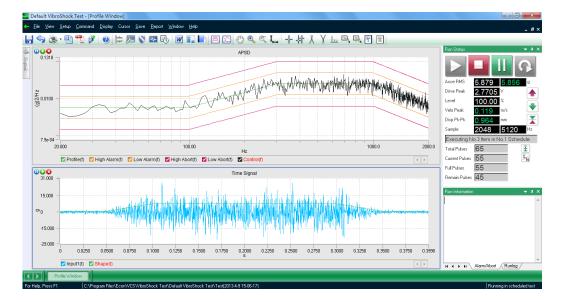


Vibro-Shock

Control Methods		Com
Control loop	PSD control method of Gaussian	Contro
с оны он то ор	random signal, patented adaptive	Level
	control algorithm with frequency	
	response equalization and updating.	Proces
	Open-loop control of Random time	Other
	domain signal cut-off by defined Shock	Carlor
Drive signal	Shape(full test)	Sche
Drive signal	Continuous Gaussian random time	Level
	domain signal Cut-off by defined Shock	Level
	Shape	Ctort/F
Control Parameter	-	Start/E
Pulse Interval		Abort O
Puise Interval	Define the time interval between two	Test R
	pulses	Caura
Control strategy	Single channel control, multi-channel	Save
	control (Weighted Average, Minimum,	<u>Shap</u>
	Maximum)	Calcul
FRF	Obtain from pre-test or import the	
	pre-stored FRF	
Frequency ranges	0 to 4680 Hz (DC), up to 18750 Hz	Slope
Frequency resolution	100, 200, 400, 800, 1600, 3200, up to	<u>Histo</u>
	6400 lines	Block
Degrees of freedom	4 to 1200	Resolu
Drive clipping	2 to 6 Sigma	Oscillo
Block Size	256 to 16384	Safet
Control Performan		Shake
Dynamic Range	> 90 dB	
Security Checks	Each frame	RMS A
<u>Profile</u>		Input o
Breakpoint	Breakpoint table with unlimited	Over-l
	combination of PSD levels	
	with slope (dB / octave) at user defined	Drive I
	frequencies	Abort
Calculation	Auto-calculates the value of crossover	Abort
	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	

	Control commands Level commands	Start, Stop, Pause, Continue Set Level, Increase Level, Decrease
<	Process command Other commands	Level, Resume Schedule Level Next Event Enable/Disable Abort Check, Reset Averaging
•	Schedule	
1.	Level Test	Set Level and time
k	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 Resolutions	2048, 4096, 8192, 16384, 32768 8 to 128
	Oscilloscope Points	128, 256, 512, 1024, 2048, 4096
	Safety	120, 200, 312, 1024, 2040, 4030
	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%
d	Drive Limit	User-defined Drive Limit Voltage
	Abort Rate	User-defined

User Stop command, Abort button



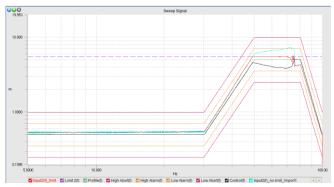


Other Applications

Waveform Editor	
Waveform Type	Sine, White Noise, Chirp, Band-Limited
Import data format	Random or import data 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

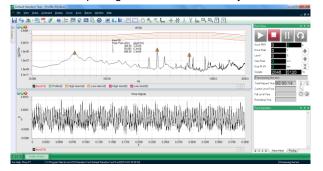
Channel Limit Spectrum Control (optional)

Including RMS limit and Notching to protect article.



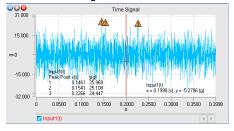
Preview

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.



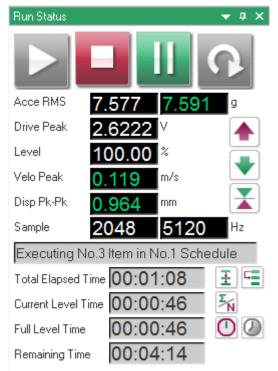
Channel Indicator Window

Can display channel voltage occupation.

De		Test - [Channel Indicato	1						
A D	le Yen Selap Do	mand Bipley Cutor :	Sava Beport Window	Heb.					- #×
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•	Polle Wedee	Numeric Window I	Channel Indicator						

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.

Select To	est File	X
Folder:	E:\Program Files\Econ\VCSDemo\Random Test\Default Random Test\Test(2013-6-	Browse
	RandRun header RandRun dala RandRun dala	
Test Type:	Random Test	
Description:	Project file, record parameters.	

Test Report

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

W 4 7 . 0	Test Report.doc (東田村	図 - Microsoft Word	0-8-0-
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•	bin type binks have been bin type binks have been bin type binks have binks have been binker binks have been binker binks have been binks have	en un	
	Current Level 100.00 % Demand RMS 7.591 g Frame Time: 0.4000 (j) Lines: 800 47:2.5 Hz DOF: 120 Current Level Time: 00:04.00 Remain Data was aswed as a file at time: 2013-4.10 AM 11:27:34 Remain 2013-4.10 AM 11:27:34	Control RMS: 7.522 g	
原題:7/10 単数:555 中文(中国) 組入			(110 G = 99% · · · · · · · · · · · · · · · · · ·

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 distributer 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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