

VT-9008-4	New Econ 4-Channel Vibration Controller with PC & Software for Sine, Random and Classical Shock Testing
	<ul> <li>4 Channel Vibration Controller</li> <li>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.</li> <li>Control Software Bundle</li> <li>Random, Sine &amp; Classical Shock (9801, 9802, 9803) &amp; Self Calibration Software License</li> <li>Accessories</li> <li>(1 pcs/copy for each system): USB 2.0 cable, Power cable, Software installation CD, User Manual, Ex- works calibration certificate, Pass code file</li> </ul>

# **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.

MDNA | AMDA | MMA | ASTM | SAE | ASM





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	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 sens	ing	
Power	40W	45W	60W	
EMC		CE Compliance		
Environmental Parameters				
Temperature		41 to 113 $^\circ\mathrm{F}$ / -10 to 50 $^\circ\mathrm{C}$		
Humidity	20% to 90	)% RH non-condensing (40 $^\circ\!\!\mathbb{C}$ /	104 °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<sub>input</sub>) 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

<b>Profiles</b>	
Breakpoint	Breakpoint table with unlimited combination of PSD levels with slope (dB / octave) at user-defined
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.

Input	Channe	1	Output Char	nnel	Cha	anel Linit									
							Sensitiv	rity			Charg	e (nV/pC)	Åb	ort (BMS	)
nput	TADe	zange (v	feighting	Combre	TEDS	iransducer	Sensitivity	Uni t	roiarity	UIISet(V)	Status	Amplifier	Enable	Value	Unit
1	Control	10	1.000	AC Dif	ON	Acceleration	100	n∛/ (g)	Pos	0	OFF		ON	10	ε
2	Honitor	10	0.000	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		OFF	10	6
3	Honi tor	10	0.000	AC Dif	OFF	Acceleration	100	n∛/ (g)	Pos	0	OFF		OFF	10	ε
4	Honitor	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	g
6	Honi tor	10	0.000	AC Dif	OFF	Acceleration	100	n¥/ (g)	Pos	0	OFF		OFF	10	ε
7	Honitor	10	0.000	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		OFF	10	ε
8	Honi tor	10	0.000	AC Dif	OFF	Acceleration	100	n∛/ (g)	Pos	0	OFF		OFF	10	ε
• (=															
В	ead TED	5			_		III			_			(	Fill D	AWE





# 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		Sch
Control mothod	Sino waveform amplitude control	Swo
Control method	adaptive control based on sine signal	0000
	amplitude undating can accurately and	
	amplitude updating, can accurately and	Deer
	time verying changes in the dynamic	Rest
	line varying changes in the dynamic	
Drive		
Drive	Analog sine signal	0
Control Performance	<u>ce</u>	Step
Dynamic Range	> 95 dB	
Control accuracy	Within ±1 dB	<b>_</b>
Loop time	5ms typically	Dwe
Frequency accuracy	0.01%	-
Control Parameters		Rest
Frequency ranges	1 Hz to 5000 Hz, up to10000Hz, Low	
	frequency extension to 0.01Hz	<b>•</b> • •
Frequency resolution	512, 1024, 2048, 4096 lines	Start
Control strategy	Single channel control, multi-channel	Abor
	control (Weighted Average, Minimum,	Loop
	Maximum)	Paus
Sweep Mode	Linear/Log	Test
Tracking filters	Proportional Bandwidth (7 to 100%) or	
3	Fixed Bandwidth	Save
Box Tolerance	Threshold and Alarm / Abort Width can	Run
	be defined	Safe
ТНО	Calculate total harmonic distortion	Shał
	between analysis frequency and the	
	order of the THD can be defined	Char
	(optional)	Peak
Profile	(optional)	Input
Brookpoint	Procknoist table with unlimited	Over
ыеакропп	combination of A V D lovels	
	with clope (dR / ectave) at user defined	Drive
	frequencies	Abor
Calculated	Auto calculatos the value of crossover	Abor
Calculated	frequency, auto check the validity of	New
	defined Brookpoint	THD
Alarm / Abort	High and low profile limits specified at	
	each breakpoint in dB with respect to	- Default Sin
	reference	
Profile view	Profile graphics are shown and updated	2.5704
	after created Automatic listing of RMS	1.0000
	acceleration and displacement values	an
	for profile. Profile operating levels are	
	compared to the shaker parameter table	0.0158
Compression rate	Define different compression rate for	
Compression rate	different frequency bands	0.0091
Sween rate	Define different sween rate for different	0.0000 -
Sweep late	frequency bands	38 0.0045 -
		0.0030 -
	Operations and literal and DO	4.40 01
waveform Type	Constant amplitude sine or DC	5.0
0	amplitude variation with frequency	For Help, Prezz F1
Commands		Step
Control commands	Start, Stop, Pause, Continue	
Level commands	Set Level, Increase Level, Decrease	
	Level, Resume Schedule Level	Sched
Frequency command	Set frequency	Cor
Sweep commands	Up/Down/Hold/Release, Set Sweep	1 Ste
	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

eep Event	Set Level, Frequency, Sweep rate, Compression rate, Sweep Direction and time
sume Sweep	Follow previous Sweep Event, Level, Low/High Frequency, Sweep rate, Compression rate, and time can be defined
o 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
p Control	Open/Close Loop
ise	Set the condition of Continue
t Report	Automatically generate reports based on user-defined
'e	Auto-save Pane, Screen, or Signals
n Flow Chart	Support up to 6 Profiles
fety	
ker 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%
/e 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
/	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 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

	Comment	Le	Level Frequency(Hz) Sweep					Time		Personalises				
Command		Value	Value Unit		High	Start	Rate Unit		Compression Rate(dB/s)	Direction	Туре	Value	Falaineteis	
1	Step Test	100	%	80	160	80			Default	Up	Sweeps	2	Clicked to Setu	
						Step	Test		X					
						Step								
						Type:		C L	inear 📀 Log					
						Step	Size:	1/ 2	Oct					
						Time								
						Off:		5	s					
						Un:		5	\$					
							OK		Cancel					
					_									
	Insert	Delete	) Ap	pend	Edi	t 🗌						Import.	Save	



#### Sine

#### **New Features**

and the second sec		.evel	Fr	equency(	Hz)			Sweep		Tin	e	Parametere
connar	Value	Unit	Low	High	Start	Rate	Unit	Compression Rate(dB/s)	Direction	Type	Value	r aldileters
Sweep Eve	nt 100	%	80	2000	80	Default		Default	Up	Sweeps -	2	
										Sweeps Cycles		
ert	Delete	Append		Edit								nport Save
			OK			Cano	el	Help				
ak A	bort					Ead	ch c	hannel c	an s	et at	oort	value

l				Sensitiv	rity		0.00	Charge	(nV/pC)		Abo	rt (Peal	c)	
input	Conbre	TEUS	Iransducer	Sensitivity	Unit	rolarit	OIISet(V)	Status .	Amplifier	Analyse	Enable	Value	Uni t	nane
1	AC Dif	OFF	Acceleration	100	mV/ (g)	Pos	0	OFF		Filter	ON		ε	Inputi
2	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		Filter	OFF	10	g	Input2
3	AC Dif	OFF	Acceleration	100	mV/ (g)	Pos	0	OFF		Filter	OFF	10	ε	Input3
4	AC Dif	OFF	Acceleration	100	nV/ (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	nV/ (g)	Pos	0	OFF		Filter	OFF	10	ε	Input6
7	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		Filter	OFF	10	ε	Input7
8	AC Dif	OFF	Acceleration	100	nV/ (g)	Pos	0	OFF		Filter	OFF	10	ε	Input8
×								111						

# Box-Tolerance

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

			that donnou in	i ionio
Control Par	ameters		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 Resur	ne from Abort			
	ОК		Cancel	



Pr	ofi	le									×
s	weep P	rofile	Speed/Co	mpress							
				_				_	OctiMin	Purcan Rata	
		Sta	rt Point	Er	nd Point	Unit			1.2000	Sweep Rate	1
		Freq.(Hz)	Sweep Rate	Freq.(Hz)	Sweep Rate	-					
	1	5	1	2000	1	Oct/Min			1.0000 -		_
									0.8000		<u> </u>
									5.0000	100.00 Hz	2000.0
	P		1	0.00				_			
	veguri	ur Speed.	1	Uct/Min			Inser	t	Delete	Append Ker	resh
								_			_
		5	Start Point		End Poir	nt -	Unit		dB/s 62.000	Compression Rate	9
		Freq.(Hz)	Compression	Rate Fre	q.(Hz) Compre	ssion Rate	Unix		02.000		
	1	5	60	2	000	60	dB/s		60.000 -		
									58.000		-
									5.0000	100.00	2000.0
								_			
	Kegula	ar Compre:	ss Kate:  60		dB/s		Inser	t	Delete	Append Ref	resh
T									OK	Concol	Holp
2	por c	3av	e						UK	Calleer	nerp





# Resonance Search Track & Dwell (RSTD)

Test Parameters		Dwell					
Parameters of the RST	D are the same with Sine.	Search Mode	Dwell when Search for a resonant				
<b>Resonance Search</b>	h		frequency or Dwell after finished Sea				
Search object	Transfer function between a pair of input channels or between input	Dwell Mode	Frequency Locked Dwell/Resonance Track Dwell/Phase Track Dwell				
	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)		- 0	×				





# **Classical Shock**

#### Control Parameters

CUILIUI Farameters	
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
	<b>D</b> (

**Pulse Duration Pulse Amplitude Test Standard** 

## **Pulse Comper**

Pulse Compensat

# Pre- and Post- An

#### Commands Control command

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

ielei s		2
	Define the time interval between two pulses	S
	1 to 10	R
	User-defined Cutoff Frequency	Ir
	pre-stored FRF	C
	256 to 16384	D
		A
	Half Sine, Initial Peak Saw-tooth, Final	A
	Rectangular Transzoid Haversine	<u>n</u>
	0.5ms to 3.000ms	S
	User-defined	S
	MIL-STD-810, ISO, User-defined	F
<u>isatio</u>	<u>on</u>	
tion	Pre- and post-pulse, post-pulse only or	F
	pre-pulse only; single or double sides	C
	of shaker stroke	
np.	specified in % with respect to reference	
_		
ls	Start, Stop, Pause, Continue	
	Level Resume Schedule Level	
	Single/Positive/Negative Pulse	

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-defined Auto-save Pane, Screen, or Signals

# **Safety**

Shaker Limit		Max. Disp	Acceleration	n, Velocity od Force lin	, nit		
RMS Abort		Fach	channel ca	n set abort	value		
Input channel	Auto	Auto-check Open-loop and Overload					
Over-limit Check	r	Line	Alarm/Abort	check Po	int	a	
		Alarr	n/Abort ratio	range: 0 t	n 100%		
Drive Limit		lleor-	defined Driv	A Limit Vo			
Abort Rate		Lleor.	defined		lage		
Abort		llear	Ston comm	and Abort	hutton		
	-	0361	otop comm	anu, Abon	button		
	2						
<u>SRS Analysis</u>	s (opti	ional)					
SRS Type		Max.	Absolute, I	Max. Positiv	ve, Max.		
		Nega	ative				
Frequency Rang	je	User	User defined Frequency Range and				
		Refe	rence Frequ	Jency			
Fractional Octav	e	1/1, 1	/3, 1/6, 1/12	2, 1/24, 1/4	-8		
Q Value		User	-defined, re	late with Da	amping F	Ratio	
Damping Ratio		User	-defined, re	late with Q	Value		
Profile					×		
Profile SRS Pare	meters						
SHS Type:	Absllax	•	g 70.422	AbsMax			
Fractional Octave Number:	1/12	-	10.000	mm			
Damping Ratio:	0.01	_	1.0000	~~~			
Q:	50	_	5.0000	100.00	2000.0		
Reference Frequency:	200	Hz	a	PosMax			
Frequency Range:	5	Нд	79.433	- In			
	2000	Hz	1.0000	~~~~			
			0.1288	100.00	2000.0		
Refresh			5.0000	Hz	2000.0		
			g	NegMax			

g 79.433

10.000

1.0000 0.1318

5.0000



2000.0

100.00 Hz

OK Cancel Help



#### Shock Response Spectrum

#### Control Parameters

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
Profile	
Break point	Breakpoint table with unlimited
Break point	combination of Acceleration levels
	with slope (dB/octave) at user defined
	frequencies
Coloulated	Auto coloulates the value of crossover
Calculated	Auto-calculates the value of clossover
	requency, 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
<b>Analysis Parameter</b>	<u>'S</u>
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 Level commands Pulse command Process command Other commands

#### **Schedule**

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

#### Save

**Safety** 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 Destil

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			
Demand Waveform Type: Sine Beat White Noise Ter	Data Winds Chirp Type: st Data	ow None 💌	Refresh 9 1.1900	Draw Limits
Data: Modify	Wave Paramet	ters	×	<del>    </del>
Compensation Type: None	Peak Value:	1g	0	12.794
,	Samp. Freq.:	160 💌 Hz	2	Velocity
	Frequency:	5 Hz	. 44	4444
Length Expand: 2048	Cycles per Beat: Resto:	5		TTTT
Sampling Freq: 160 Block Size: 2048	Interval:	500 ms	: 0 '90 -	12.794 s
	ОК	Cancel		Displacement
Minimum			34	A 10.0 A
Acce (g): -0.99170	0.99170 50	1.98%	0	
Velo(m/s): -0.31709 Disp(mm): -11.52692	0.30243 1.75	-25 5 45 21%	-13.832	6 C C C
Force (N):	19.4373 980	1.98%	Ó	12.794 s
Import Save			OK C	ancel Help



# **Transient Time History**





# Long Time History for Load

<b>Control Methods</b>		Command	
Equalization method	Low level random equalize transfer	Control command	Start, Stop, Pause, Continue Set Level Increase Level Decrease
<b>Control Performan</b>	Ce		Level, Resume Schedule Level
Control strategy	Single channel control, multi-channel control (optional)	Process command Other command	Next Event, Next Profile Set FRF Update Ratio, Open/Close
FRF	Obtain from pre-test or import the pre-stored FRF		Control Loop, Enable/Disable Abort Check
FRF Update Ratio	0 to 0.5	Schedule	
Pre-test Profile		Level Test	Set Level
Break point	Breakpoint table with unlimited combination of APSD levels with slope (dB/octave) at user defined frequencies	Start/End Loop Abort Check Loop Control	Set Loop time and Loop Start/Stop Enable and Disable Abort Check Open/Close Loop
Calculated	Auto-calculates the value of crossover frequency, auto-check the validity of	Test Report	Automatically generate reports based on user-defined
	defined Break point	Save	Auto-save Pane, Screen, or Signals
<u>Profile</u>		Run Flow Chart	Support up to 6 Profiles
Data sources	Waveform Editor generated road data	Safety	•• • • • • • •
	files (. cps)	Shaker Limit	Max. Acceleration, Velocity,
Modify Data	Modify scale factor to adjust the amplitude or modify polarity of the waveform	RMS Abort Input channel	Displacement and Force limit Each channel can set abort value Auto-check Open-loop and Overload
Abort Limit	High/Low Abort Limit specified in acceleration	Over-limit Check	Line Alarm/Abort check, Line Alarm/Abort ratio range: 0 to 100%
Frame Size	1024, 2048, 4096	Drive Limit	User-defined Drive Limit Voltage
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 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.
Drive signal	domain signal cut-off by defined Shock Shape(full test) Continuous Gaussian random time domain signal Cut-off by defined Shock Shape
<b>Control Parameters</b>	
Pulse Interval	Define the time interval between two
Control strategy	pulses Single channel control, multi-channel control (Weighted Average, Minimum, Maximum)
FRF	Obtain from pre-test or import the
Frequency ranges Frequency resolution	0 to 4680 Hz (DC), up to 18750 Hz 100, 200, 400, 800, 1600, 3200, up to
Degrees of freedom Drive clipping Block Size	4 to 1200 2 to 6 Sigma 256 to 16384
<b>Control Performance</b>	<u>;e</u>
Dynamic Range Security Checks Profile	> 90 dB Each frame
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
Profile view	calculated automatically from profile or defined by user Auto-calculated or manual set 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

### Commondo

	Commands	
	Control commands Level commands	Start, Stop, Pause, Continue 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
		Automotionally reports reports housed
	lest Report	Automatically generate reports based
	Caula	on user-defined
	Save	Auto-save Parie, Screen, or Signals
	Snape Profile	<b>.</b>
	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
	<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, 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.

De		n Test - [Channel Indicato	1						
A D	le Yerr Selva Di	meand Biplay Curor :	Sava Bapat Window	Heb.					- #×
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		0.00%	6.00x	8.00X	a.00%	0.801	2007	0.001	Potrolocados 20 20 20 20 20 20 20 20 20 20 20 20 20
•	Puble Window	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 T	est File	X
Folder:	E:\Program Files\Econ\VCSDemo\Random Test\Default Random Test\Test(2013-6-"Bi	rowse
	RandFun header RandFun data1 RandFun data10 RandFun data11 RandFun data12 RandFun data13 RandFun data14 RandFun data15 RandFun data15 RandFun data15 RandFun data15 RandFun data17	
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.do	(東田墳町) - Microsoft Word		0.8 -0-
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	Current Level 100.00 % Demand RMS 7.51 Frame Time: 0.4000 (s) Lines: 800 dF 2.5 DOF: 120 Current Level Time: 00:04:00 Data was saved as a file at time: 2013-4-10 AM 11:27	1 g Control RMS: 7.522 g Hz Remaining Time: 00:00:00 34		
京都 7/10 単数 555 中文(中国) 私人			1 to (2 = 909	s⊖ • ÷

#### **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**

ltem	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

Frank Bacon Machinery Sales Co. 4433 E. 8 Mile Rd. Warre, MI 48091 Tel: 586-756-4280 Fax: 586-756-8009 Email: sales@frankbacon.com

#### Website: www.frankbacon.com

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