ECO GREEN

CE

RION

32 GB & 8 channels

Support for high-capacity memory cards up to 32 GB

Inter-unit synchronization: max. 8 channels

4 channel Data Recorder

DA-21

The 4 channel Data Recorder DA-21 is capable of recording acoustic / vibration waveforms and various electrical signals in the field.
Recorded data are saved in WAVE format on SD cards and can be imported into a computer for waveform analysis and other processing tasks.

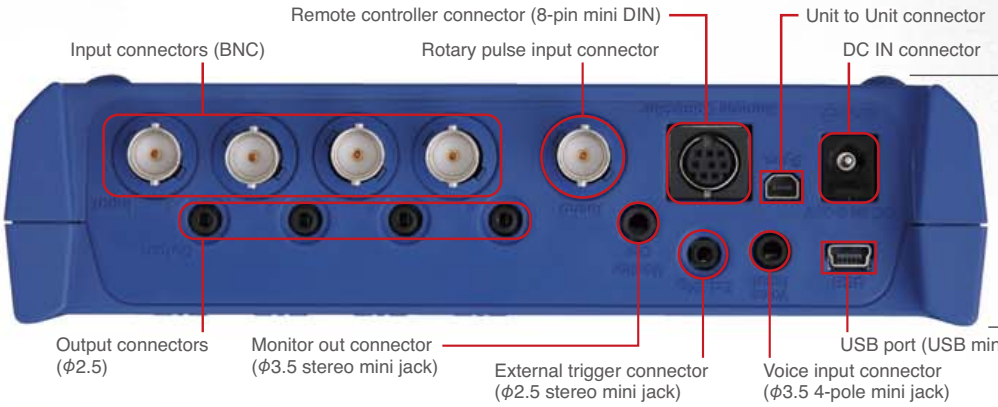
4 channel Data Recorder

DA-21 CE

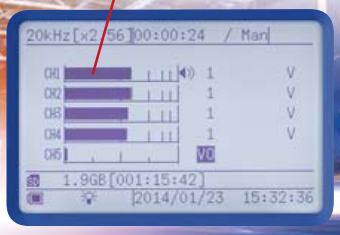
Playback of recorded data supported

Silent operation without any moving parts. Able to operate also in difficult environments subject to vibration and humidity.

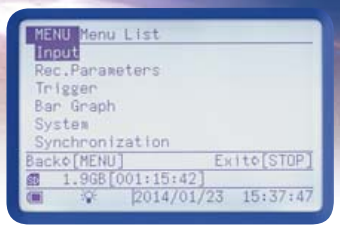
Voice memo recording function



Bar graph provides visual level indication



Measurement screen



Menu screen

175 mm

Software

DA-21 data can be displayed and analyzed in various software packages

Viewer Software

AS-70 Viewer **Supplied**

4 channel display screen example

Reads WAVE format files produced by the DA-21 and enables functions such as waveform display, level display, file output (WAVE format/CSV format), and playback. Display of inter-unit synchronization data is also supported.

Specifications

Graph	Display types	Amplitude waveform, level waveform
	Frequency weighting characteristics	Z, A, C, G, C to A, vertical vibration characteristics, horizontal vibration characteristics
	Time weighting characteristics	10 ms, F (Fast), 630 ms, S (Slow), 10 s
Statistical processing	Amplitude waveform	Maximum value, minimum value, average value, variance, effective value
	Level waveform	L_{eq} / L_E / L_{max} / L_{min} / L_N (5 types)

Waveform Analysis Software

AS-70 **Option**

Waveform analysis screen example

Adds octav and FFT a

Specification

Waveform analysis
Frequency characterist
FFT analysis
Time weightin
Octave band analysis

Operating environment requirements

Viewer software AS-70 Viewer / Waveform Analysis Software AS-70 ■ CPU : Intel Core i5 2 GHz or faster ■ RAM : 2 GB or more, 4 GB recommended ■ HDD : 20 GB or m
Waveform analysis software CAT-WAVE ■ CPU : Intel Core i5/i7 1.4 GHz or more (Core2 Duo 2 GHz or more) ■ RAM : 2 GB or more ■ HDD : 60 GB or more (free spa

Improvements compared to predecessor model DA-20

- **Support for high-capacity SD cards (max. 32 GB)**
- **Quantization** 24 bit also supported
- **Use as USB storage supported** (recognized as removable disk)
- **Additional rotary signal input** (dedicated connector)
- **Inter-unit synchronization (max. 8 channels)**
- **Separate input and playback output connectors**
- **Time trigger function added**

Battery Life

Using four IEC R6 (size AA) alkaline batteries

Approx. **8** hours *1

*1 20 kHz, 4ch, CCLD OFF

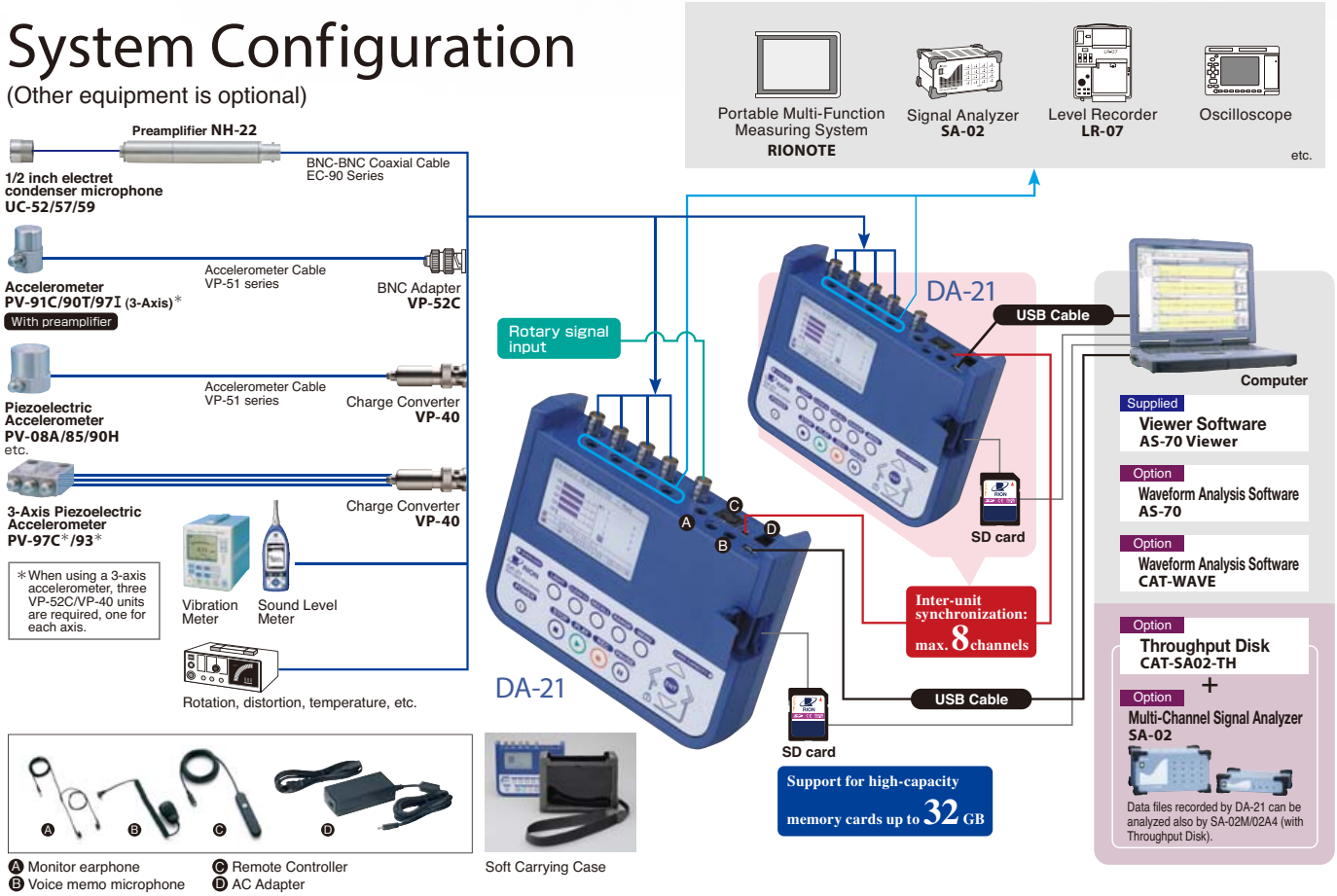
Using Battery Pack BP-21A with four IEC R20 (size D) alkaline batteries

Approx. **30** hours *2

*2 Depending on recording settings

System Configuration

(Other equipment is optional)

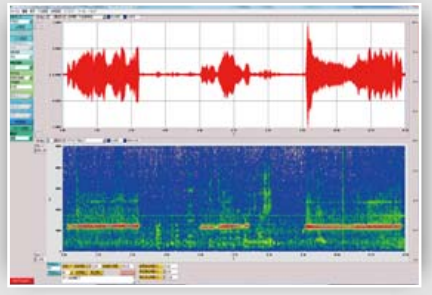


ve band, 1/3 octave band,
nalysis functions to AS-70Viewer

Processing functions	Maximum value, minimum value, average value, effective value, distribution, differentiation and integration, HPF, LPF
weighting ics	Z, A, C, G, C to A, vertical vibration characteristics, horizontal vibration characteristics
Number of analysis points	32 to 65 536 points
Data view	Power spectrum, power spectrum density, spectrogram
g characteristics	10 ms, F (Fast) , 630 ms, S (Slow), 10 s
Applicable standards	JIS C 1514 (IEC 61260) Class 1
Analysis frequencies	octave bands 0.5 Hz to 16 kHz, 1/3 octave bands 0.4 Hz to 20 kHz

Waveform Analysis Software

CAT-WAVE **Option** This software is a product of Catec Inc.



Spectrum map screen example

Reads WAVE format files produced by the DA-21 and enables functions such as octave band analysis, 1/3 octave band analysis, and FFT analysis. Inter-channel processing functions such as cross spectrum and transfer function, as well as 1/12 octave band analysis are also possible. (Tracking analysis can be added as an option.)

Specifications

Waveform	Display	Scaled time axis, Differential and integral calculus available
FFT analysis	Sampling points	64 to 32 768 points
	Display function	Power spectrum, Cross spectrum, Transfer function, Coherence, Power spectrum map, Differential and integral calculus for spectrum area
Octave band analysis	Applicable standard	JIS C 1514 (IEC 61260) Class 1
	Frequency range	Octave band 0.5 Hz to 8 kHz (15 bands), 1/3 octave band 0.4 Hz to 10 kHz (45 bands), 1/12 octave band 0.36 Hz to 11 kHz (180 bands)
Time weighting characteristics		1 ms, 10 ms, 35 ms, F (Fast), 630 ms, S (Slow), 10 s
Frequency weighting characteristics		FLAT, A, C

ore (free space), 100 GB or more recommended ■ DISPLAY : XGA (1024×768) or higher ■ OS : Microsoft Windows XP Professional 32 bit, 7 Professional 32 bit/64 bit, 8 Pro 32 bit/64 bit
ce) ■ DISPLAY : SXGA (1280×1024) or higher ■ OS : Microsoft Windows XP Professional, Vista Business 32 bit, 7 Professional 32 bit / 64 bit

Specifications 4 channel Data Recorder DA-21

Input Section	Input connectors		
	Signal input	4 channels (BNC)	
	Rotation speed (rotary pulse)	1 channel (BNC)	
	Voice memo input	1 channel (voice memo microphone 3.5 mm. 4-pole mini jack)	
	External trigger input	1 (φ2.5 mm. stereo mini jack)	
	Remote control	For optional remote controller, 8-pin mini DIN	
	USB port	Mini B	
	Input range	±0.01 V, 0.03 V, 0.1 V, 0.3 V, 1 V, 3 V, 10 V	
	Input impedance	100 kΩ or more	
	Max. input voltage	±13 V	
	Overload	+2.0 dB ±1.0 dB at range full-scale	
	Input coupling	AC/DC (AC coupling (primary) −3.0 dB ±1.0 dB at 0.315 Hz)	
	CCLD (Constant Current Line Drive)	2 mA, 24 V	
	Filters (digital)	High-pass OFF, 5 Hz (−3 dB ±1.0 dB) (−12 dB / oct) / Low-pass OFF, 200 Hz, 1 kHz, 2 kHz (−3 dB ±1.0 dB) (−12 dB / oct)	
	Frequency response		
	DC coupling	DC to 1 Hz: ±1.0 dB 1 Hz to 12.5 kHz: ±0.5 dB 12.5 kHz to 20 kHz: ±1.0 dB	
	AC coupling	1 Hz: ±1.0 dB 1 Hz to 12.5 kHz: ±0.5 dB 12.5 kHz to 20 kHz: ±1.0 dB	
	Inter-channel phase difference	Max. 1 deg. (with AC coupling, HPF OFF, same frequency range, 20 kHz range)	
	S/N ratio	80 dB or more (input voltage range: 10, 3, 1, 0.3 V; within frequency band; including overload)	
	Distortion	Max. 0.1 % (within frequency band)	
	Voice memo function	2 operation modes A: Recording in stand by state B: Revolution speed channel is always used as voice memo during recording Revolution speed function is disabled while using voice memo function ※Marker function becomes also active during recording	
	Rotary pulse	Input impedance 100 kΩ or more	
	Input voltage range	0 to 10 V, open collector	
	Threshold level	Approx. 2.5 V	
	Counting method	Periodic measurement	
	Revolution measurement range	200 to 600 000 rpm (1 pulse / rotation)	
Output Section	Output Connectors		
	Playback output	4 (φ2.5, separate from signal input), for playback of recorded signal, output impedance 600 Ω	
	Frequency response	DC to 1 Hz: ±1.0 dB, 1 Hz to 12.5 kHz: ±0.5 dB, 12.5 kHz to 20 kHz: ±1.0 dB	
	Output voltage	±3.16 V at range full-scale	
	Max. output voltage	±4.0 V	
	Inter-channel phase difference	Max.1 deg. (within frequency range)	
	Monitor output	1 channel (φ3.5 stereo mini jack), Output impedance 100 Ω	
	During recording	Analog signal for 1 selected channel	
	During playback	Playback output of any selected channel (including voice memo)	
	Output voltage	±3.16 V at range full-scale	
	Max. output voltage	±5.5 V	
	Playback output selection	Output from playback output and monitor output	
Recorder Section	Recording media	SD card (Use only RION supplied cards for assured operation.) Max. capacity 32 GB File system (FAT16/FAT32)	
	AD converter	Quantization: 24 bit, Bit length 16 bit/24 bit selectable from menu	
	File format	WAVE (16 bit/24 bit, linear, non-compressed)	
	Frequency range	100 Hz, 500 Hz, 1 kHz, 5 kHz, 10 kHz, 20 kHz	
	Sampling frequency	Frequency range x 2.4 / 2.56	
	Max. recording time	Approx. 23 hours (20 kHz, sampling frequency x2.4, 4 channels, 32 GB card)	
	Pre-recording	Data captured since 0 s, 1 s, or 5 s before recording key was pressed, or triggered	

Trigger Section	Trigger source	External: Open-collector trigger External, External Gate (Comparator output of Sound Level Meter NL-62, NL-52, NL-42 supported)	
		Internal: Level trigger (Waveform) 0.1 % to 0.9 %, 1 % to 99 % of range full-scale, linear peak Time trigger: Repeated recording at preset intervals between specified start time and end time possible	
	Trigger mode	Free, single, repeat (file division for repeat)	
	Pre-trigger	0 s, 1 s, 5 s (prior to trigger time)	
Calibration	Conversion	Linear (EU), Log (dB) Selectable for each channel	
Display Section	LCD	256 x 160 dots (Monochromatic LCD, with backlight)	
	Display items	Setting screen, recording screen, level bars, level history	
	LEDs	Overload indication, SD card low space warning, status indication (record, playback, trigger standby, etc.)	
Saving settings		Five sets of settings can be saved in internal memory, startup files on SD card	
USB	Mass storage class	Recognized as removable disk	
Power Supply Section	Power requirements	Batteries or dedicated AC adapter (NC-98C), cigarette lighter adapter (CC-82)	
	Batteries	Four IEC R6 (size AA) batteries (alkaline or nickel-hydride rechargeable batteries)	
	External DC	5 to 20 V, current consumption 190 mA (6 V) (Frequency range 100 Hz, CCLD OFF, backlight OFF, monitor output OFF)	
	Battery life (using alkaline batteries in cont. operation at 23 °C, back light off,typical value for 32 GB card)	Alkaline batteries	20 kHz, 4 channels, CCLD ON: approx. 4.5 hours CCLD OFF: approx. 8 hours 20 kHz, 1 channel, CCLD ON: approx. 7.5 hours CCLD OFF: approx. 10 hours
		Nickel-hydride batteries (capacity 2450 mAh)	20 kHz, 4 channels, CCLD ON: approx. 7 hours CCLD OFF: approx. 10 hours 20 kHz, 1 channel, CCLD ON: approx. 11 hours CCLD OFF: approx. 12 hours
Inter-unit synchronization function		Synchronized operation of two units allows simultaneous waveform level recording in up to 8 channels	
Dimensions and Weight		Approx. 140 (H) x 175 (W) x 45 (D) mm, approx. 450 g (excl. batteries)	
Ambient conditions for operation		-10 °C to +50 °C, 10 % to 90 % RH (no condensation)	
Supplied Accessories		IEC R6 (size AA) alkaline battery x 4, AS-70Viewer x 1	

Option

Product		Designation
Waveform analysis software		AS-70
Waveform analysis software		CAT-WAVE
Charge Converter		VP-40
Memory card*1 (SD card)	2 GB	MC-20SD2
	32 GB	MC-32SD3
AC adapter		NC-98C
Battery pack		BP-21A
Cigarette lighter adapter		CC-82
4-channel data recorder remote controller		DA-20RC1
Voice memo microphone		MH-34B4B
Monitor earphone		ATH-C320
Soft Carrying Case (with shoulder strap)		DA-20007
BNC-BNC coaxial cable		EC-90 series (2 m and up)
BNC-BNC cable		NC-39A
BNC-mini plug Cable		CC-24
Comparator output cable (for NL-42/52)*2		CC-42C
Inter-unit sync cable		CC-43
USB A-Mini B Cable		—

*1 Use only RION supplied cards for assured operation.
*2 When used with the DA-21, BNC-mini plug Cable CC-24 and Joint connector VP-54C are required.

Maximum recording times on memory card (SD card) [Approximate]

32 GB SD card Sampling frequency: x2.56 (2.4 also supported), Quantization: 16 bit

Number of channels	Frequency range (Hz)					
	100 Hz	500 Hz	1 kHz	5 kHz	10 kHz	20 kHz
1	17066 h 40 m	3413 h 20 m	1706 h 40 m	341 h 20 m	170 h 40 m	85 h 20 m
2	8533 h 20 m	1706 h 40 m	853 h 20 m	170 h 40 m	85 h 20 m	42 h 40 m
3	5688 h 32 m	1137 h 36 m	568 h 48 m	113 h 36 m	56 h 48 m	28 h 24 m
4	4266 h 40 m	853 h 20 m	426 h 40 m	85 h 20 m	42 h 40 m	21 h 20 m

2 GB SD card Sampling frequency: x2.56 (2.4 also supported), Quantization: 16 bit

Number of channels	Frequency range (Hz)					
	100 Hz	500 Hz	1 kHz	5 kHz	10 kHz	20 kHz
1	1066 h 40 m	213 h 20 m	106 h 40 m	21 h 20 m	10 h 40 m	5 h 20 m
2	533 h 20 m	106 h 40 m	53 h 20 m	10 h 40 m	5 h 20 m	2 h 40 m
3	355 h 32 m	71 h 06 m	35 h 33 m	7 h 06 m	3 h 33 m	1 h 46 m
4	266 h 40 m	53 h 20 m	26 h 40 m	5 h 20 m	2 h 40 m	1 h 20 m

＊Varies slightly depending on number of data files ＊Maximum recording time for one file is approx. 1000 hours. ＊Use only RION supplied cards for assured operation.

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