



# 32 GB & 8 channels

Support for high-capacity memory cards up to **32 GB**

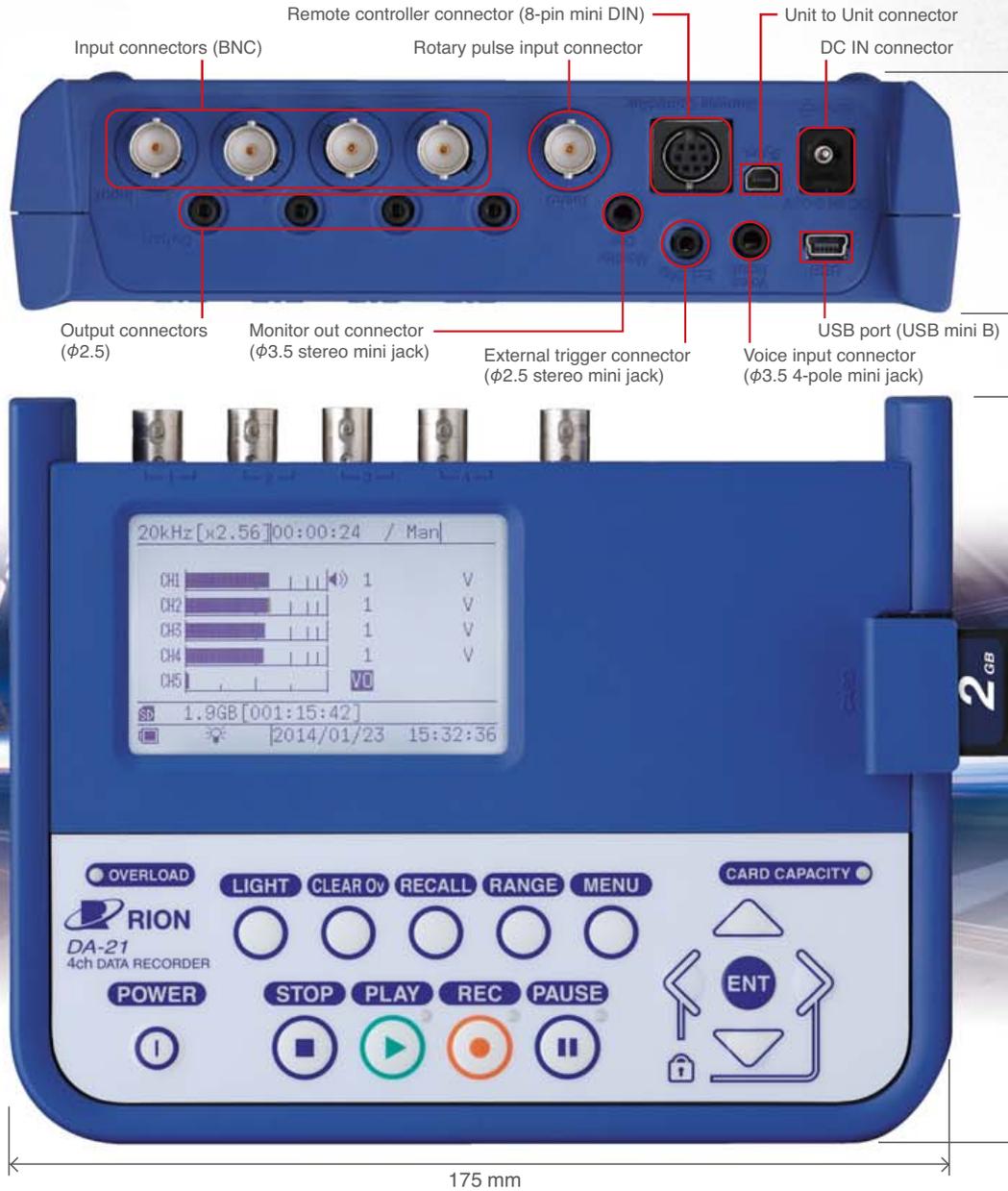
Inter-unit synchronization: max. **8** channels



## 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

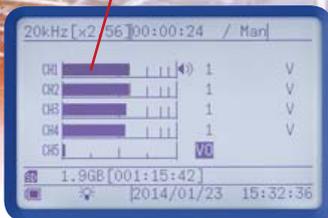


Playback of recorded data supported

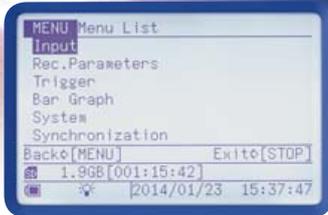
Silent operation without any moving parts. Able to operate also in difficult environments subject to vibration and humidity.

Voice memo recording function

Bar graph provides visual level indication



Measurement screen



Menu screen

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

### Viewer Software AS-70 Viewer Supplied



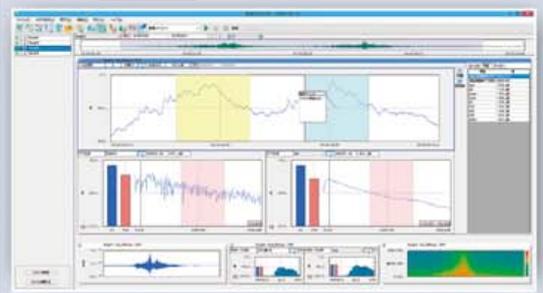
4 channel display screen example

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 <sub>eq</sub> / L <sub>E</sub> / L <sub>max</sub> / L <sub>min</sub> / L <sub>N</sub> (5 types)

### Waveform Analysis Software AS-70 Option



Waveform analysis screen example

Adds octave band analysis and FFT analysis

Specification: Waveform analysis

Frequency characteristics: FFT analysis

Time weighting: 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 more  
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 space)

# Improvements compared to predecessor model DA-20



## 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

**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)**

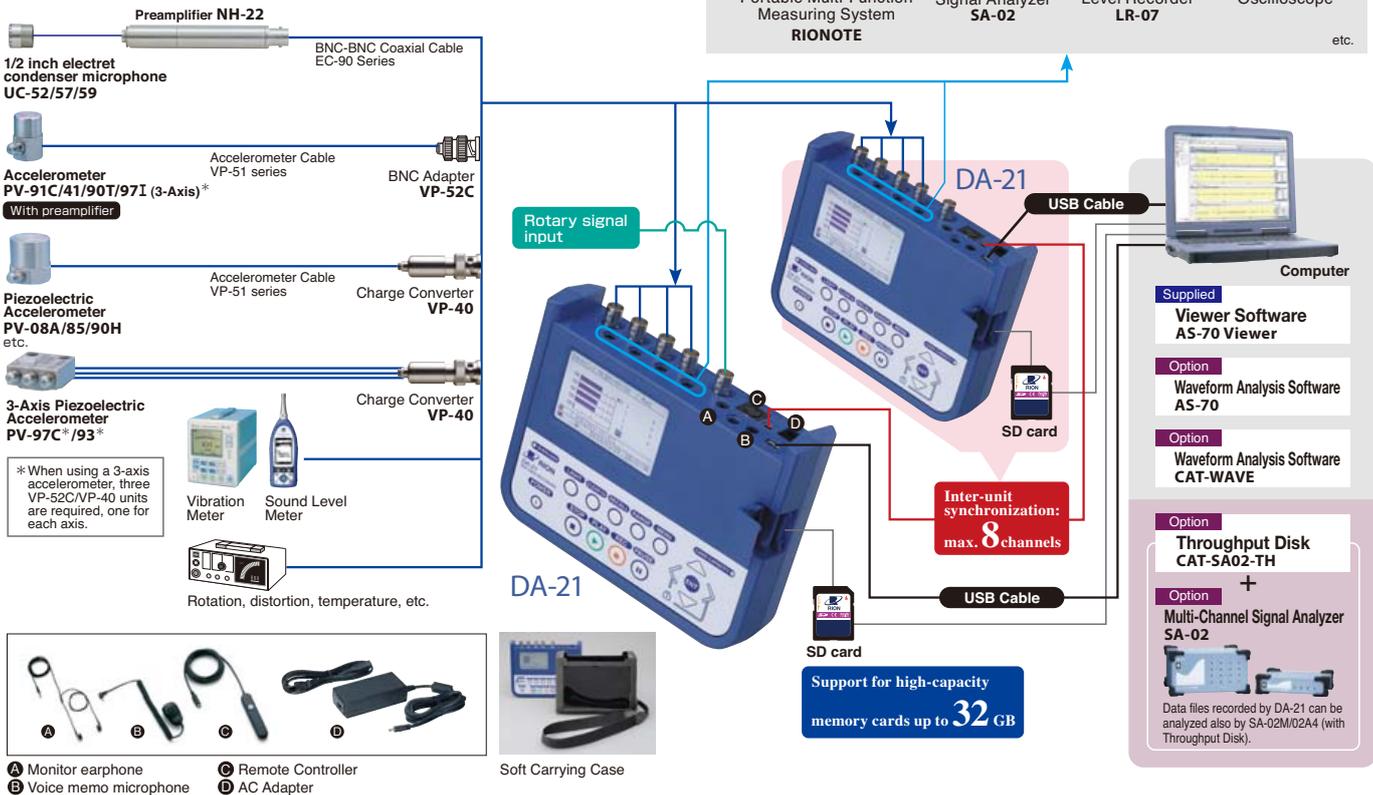
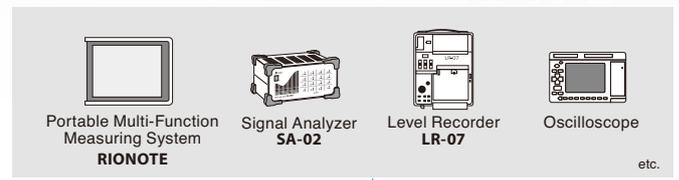
**Inter-unit synchronization (max. 8 channels)**

**Separate input and playback output connectors**

**Time trigger function added**

## System Configuration

(Other equipment is optional)



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

## 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
	Sampling points	64 to 32 768 points
FFT analysis	Display function	Power spectrum, Cross spectrum, Transfer function, Coherence, Power spectrum map, Differential and integral calculus for spectrum area
	Applicable standard	JIS C 1514 (IEC 61260) Class 1
Octave band analysis	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)
Calibration	Pre-trigger	0 s, 1 s, 5 s (prior to trigger time)
	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	2 GB MC-20SD2
(SD card)	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

\*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.

**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

\* Specifications subject to change without notice.



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