RION

Smart portable unit allows transfer function measurement in the field

2-Channel Compact FFT Analyzer **SA-78**

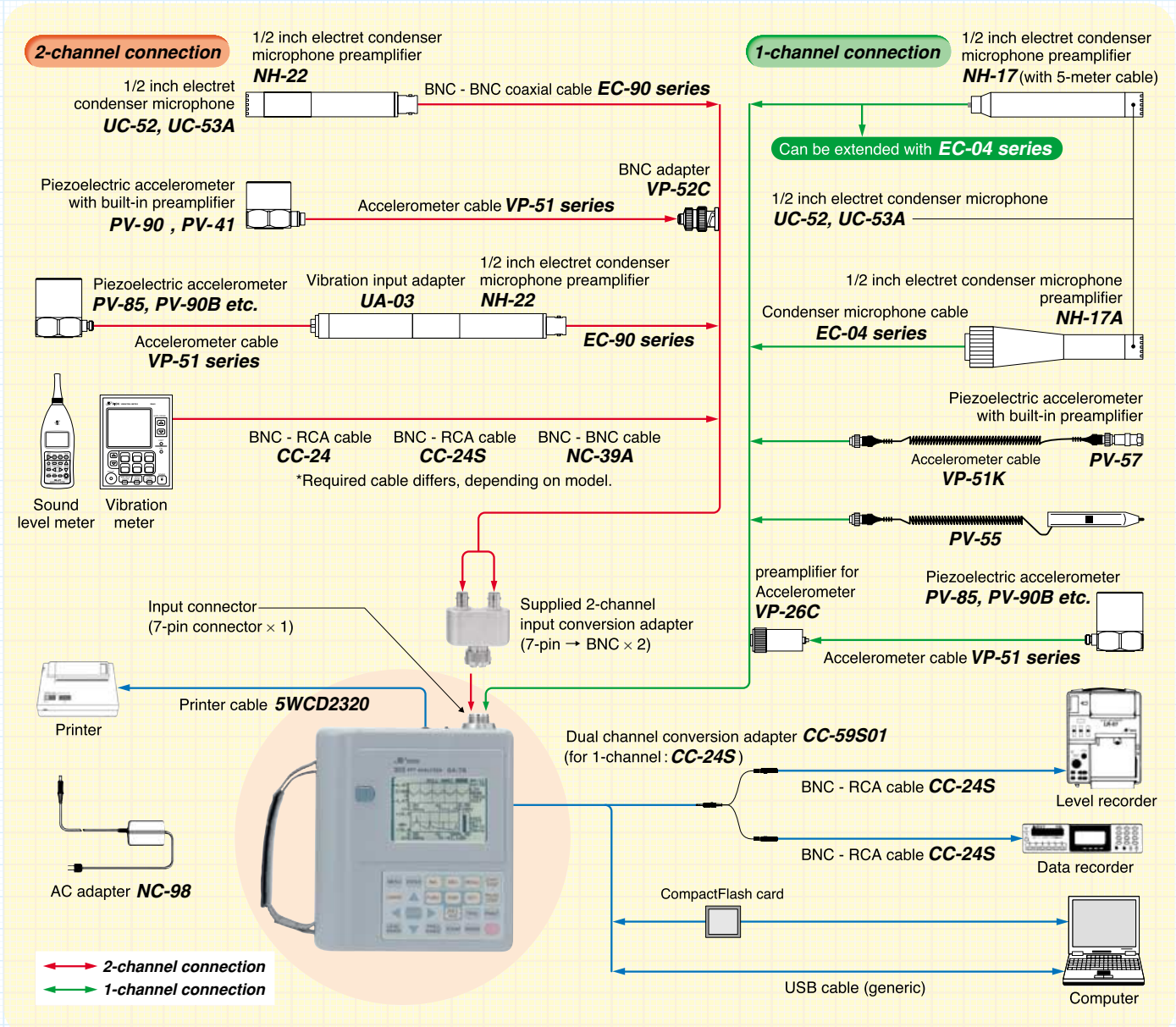
Outline

The SA-78 is a 2-channel FFT analyzer designed for easy portability. It is convenient for performing sound or vibration FFT analysis as well as octave analysis in the field. The dual channel configuration allows transfer function measurement and other advanced measurement-quality electret condenser microphone. CompactFlash memory cards are used to store data and measurement results. Data can then be easily transferred to a computer for display as a graph or further processing by spreadsheet applications. An optional Waveform Recording Card (SA-78WR) allows long-term time waveform recording.

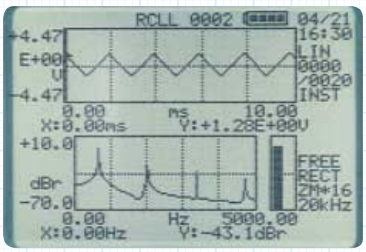
Features

- Direct connection of microphone or accelerometer possible. (Using CCLD type microphone preamplifier NH-22)
- 2-channel input allows easy transfer function measurement in the field.
- Support for FFT processing and octave analysis (synthesized).
- Upper frequency limit of 80 kHz enables ultrasound analysis.
- Measurement results and waveform data can be stored on memory card. (For waveform recording, the optional Waveform Recording Card SA-78WR is required.)
- Waveform analysis can be carried out using Waveform Analysis Software CAT-78WR.
- USB port allows easy connection to PC (only using supplied Data Monitoring Software).
- Hard copy of measurement results can be produced on site (with optional printer).
- Connection of data recorder with AC output supported.
- Light weight and compact dimensions combined with intuitive operation allow easy use anywhere.
- Operates up to 15 hours on a set of four IEC R14 (size C) batteries (backlight and CCLD functions off).

System Diagram

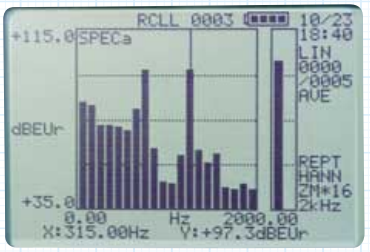


SA-78 Display Screen Examples

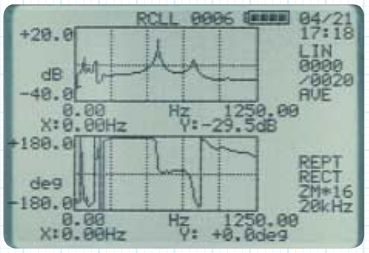


Waveform and spectrum display

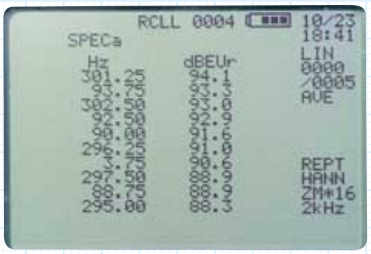
Spectrum display



1/3 octave band display



Transfer function (amplitude, phase) display



Peak list display

Option — Waveform Recording Card SA-78WR

Integrates a time waveform recording function in the 2-Channel Compact FFTAnalyzer

The Waveform Recording Card SA-78WR contains optional software for the 2-Channel Compact FFT Analyzer SA-78. The software implements a time waveform recording function directly in the SA-78. After the function has been installed, signal waveform data along with calibration data are saved in WAVE file format (****.WAV) on a dedicated CompactFlash card inserted in the SA-78. The resulting data files can be processed using the Waveform Analysis Software CAT-78WR.

Specifications

Recording media : PCMCIA standard CompactFlash card (128 MB)
Recorded data : WAVE format
Capacity : 1 MB/(10 s/1 ch/20 kHz)
Frequency range : 100Hz-20kHz
Trigger : Free-run, single
Waveform analysis software : Waveform Analysis Software CAT-78WR or Multi-Channel Analyzer SA-01

Maximum recording times (using 128 MB CF card)

	100Hz	200Hz	500Hz	1kHz	2kHz	5kHz	10kHz	20kHz
1 channel recording	66 h 40 m	33 h 20 m	13 h 20 m	6 h 40 m	3 h 20 m	1 h 20 m	40 m	20 m
2 channel recording	33 h 20 m	16 h 40 m	6 h 40 m	3 h 20 m	1 h 40 m	40 m	20 m	—

*Use only CompactFlash cards supplied by Rion as recording media.

SA-78WR screen

Option — Waveform Analysis Software CAT-78WR

Supported operating systems: Windows 98SE, Me, 2000, XP

(This software is a product of Catec Inc.)

The software allows processing and storage management of WAVE format files containing data recorded using the 2-Channel Compact FFT Analyzer SA-78 in conjunction with the Waveform Recording Card SA-78WR. FFT analysis or octave analysis can be selected.

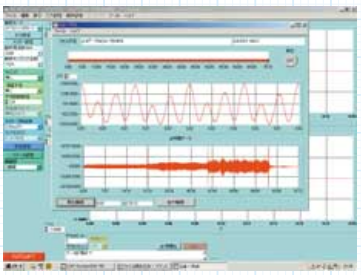
Specifications

FFT analysis

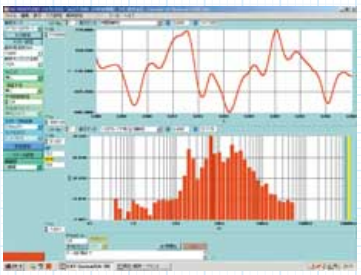
Frequency range : 100, 200, 500, 1k, 2k, 5k, 10k, 20k
Number of sampling points : 64 - 32768
Averaging functions : Linear, maximum hold
Window functions : Rectangular, Hanning, Flat-top, Exponential, Force
Display functions : Power spectrum, cross spectrum, spectrum map, transfer function, coherence

1/N octave analysis

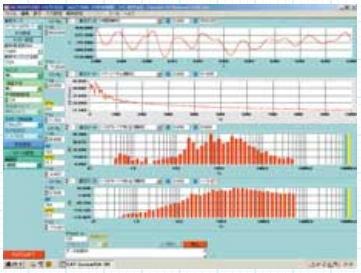
Filter compliance : JIS 1514:2002
IEC 61260-1995 CLASS 1
Analysis frequency : 1/1 octave
0.5 - 8,000 Hz (15 bands)
1/3 octave
0.4 - 10,000 Hz (45 bands)
1/12 octave
0.36 - 11,000 Hz (180 bands)
Averaging functions : Linear, exponential, maximum hold
Display functions : Bar graph, numerical list



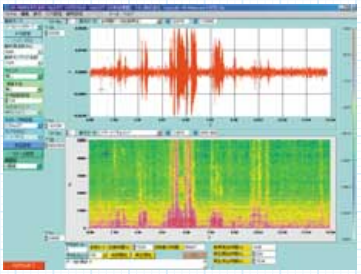
Waveform read-in screen



FFT & 1/3 octave analysis screen



4-graph screen



Spectrum map screen

Specifications

Input section	
Number of channels	2
Input connectors	BNC × 2 (with supplied input converter)
Input impedance	100 KΩ
Maximum input voltage	±20 V
Input coupling type	AC or DC (for 0.5 Hz/-3 dB for AC)
Sensor drive power supply (CCLD)	2 mA, 18 V (4 mA sensors can also be connected)
Frequency range	DC - 80 kHz
Level range	-40 to +20 dB (10-dB steps) 0 dB/1 Vrms
Input filters	High-pass filter : 20 Hz, 100 Hz (-1 dB point) Low-pass filter : 1 kHz, 20 kHz (-1 dB point) Both switchable, attenuation slope -18 dB/oct.
Overload	Range full-scale +2 dB (overload warning indication on display)
A/D converter	16 bit (sigma-delta type)
Dynamic range	Overall 85 dB (60 dB for 50 kHz range and 80 kHz range)
Analyzer section	
Frequency range	100, 200, 500, 1 k, 2 k, 5 k, 10 k, 20 k, 50 k, 80 k Hz
Reference channel	Channel A or B, selectable
Analysis functions	Time waveform, power spectrum, cross power spectrum (amplitude, phase), transfer function (amplitude, phase), coherence
Window types	Rectangular, Hanning, Flat-top
FFT zoom settings	101 (×1), 201 (×2), 401 (×4), 801 (×8), 1601 (×16) lines
Averaging processing	Processing modes: linear averaging, exponential averaging, peak hold (power spectrum only) Processing domain: time (linear averaging only), frequency Number of averaging runs: 1 to 8000 * To perform averaging in the time domain, analysis of averaged time waveform is used.
Arithmetic frequency weighting	Types: A characteristics, 2 user-defined characteristics Weighting target: overall value * User-defined characteristics are read from file with frequency compensation data (created with Excel or similar) on CompactFlash card.
Octave synthesis	Types: 1/1 octave, 1/3 octave Targets: power spectrum, cross power spectrum (×16 zoom)
Differentiation	Types: $-1/\omega^2$, $1/j\omega$, $j\omega$, $-\omega^2$ Targets: power spectrum, cross power spectrum, transfer function
Overall value	Normal overall value and frequency weighted overall value are calculated simultaneously. (If frequency weighting was specified, partial overall is calculated.)
Display	
Display type	192 × 128 dot LCD (77.5 × 54 mm) with backlight
Number of graphs	1 or 2
Graph types	Time waveform, power spectrum, cross power spectrum (power), cross power spectrum (phase), transfer function (amplitude), transfer function (phase), coherence
Peak list	Frequency and numerical value for ten highest values in selected function type are shown as list display. * Not available for time waveform, cross power spectrum (phase), transfer function (phase), and coherence.
Number of frequency lines	101 + overall value + frequency weighted overall value
Number of time waveform display points	128
Display units	X axis: Hz, ms Y axis: V, EU, dB, dBEU, DEG (degrees)
Y axis display	Linear, dB
Display zoom	
X axis	Time waveform: 1 - 32× (depending on FFT zoom ratio) Other: 1 - 16× (depending on FFT zoom ratio)
Y axis	Linear display: 1 - 1024× (lower limit fixed to 0, upper limit depending on zoom ratio) dB display: 80 dB span, 40 dB span
Cursors	X value and Y value readouts for cursor position (for single-graph, differential readout for 2 cursors possible), overall value display for power spectrum graph, partial overall frequency range can be specified.
Calibration functions	
Calibration value setting	When Y axis display is linear, specify voltage value [V] corresponding to 1 [EU]. When Y axis display is dB, specify voltage level [dB] corresponding to 0 [dB EU]. (Setting can be made while checking overall value reflecting the calibration input.)
Reference setting	Specify EU value corresponding to 0 [dB EU]
Clock function	Date and time indication
Trigger section	
Trigger mode	Free-run, repeat, single
Trigger source	Input signal level or external trigger signal
Trigger position	-4096 (pre-trigger) to +4096 (post-trigger)
Trigger slope	Rising edge (+) or falling edge (-)
Trigger level	-15/16 to +15/16 of range full-scale, in 1/16-steps

Memory section	
Manual store	
Store data	Data shown on display when STORE key is pressed, setup parameter, date and time information
Store media	CompactFlash card (use Rion supplied cards for assured operation)
Number of blocks	8 (default), expandable to 99 in folders created by user on card in a computer
Total number of data	approx. 1000 (zoom ratio ×1, using supplied 16 MB card)
Recall	Call up data from any address
Setup parameter memory	
Stored data	Unit settings
Number of data	8 sets
Store location	Internal memory
File operations	CompactFlash card initialization for SA-78, display of files on CompactFlash card, selective overwrite and erase
Resume function	Settings established when unit is turned off are memorized and restored when unit is next turned on.
Input/output section	
AC output	Connector type: 2.5 dia. stereo jack Output impedance: 100 Ω Output voltage: 1 Vrms at range full-scale
External trigger input	Connector type: 2.5 dia. mono jack Input signal: Falling edge (Low level for 1 ms or more) (HI level 3 - 6 V, LOW level 0 V)
Printer port	Connector type: 9-pin D-sub, male Transfer principle: RS-232C, 9600 bps Function: Hard copy of display contents Compatible printers: DPU-414, CP-11, CP-10 Cable: Generic straight-wired cable
USB port	Connector type: USB Type B, female Transfer principle: USB 1.1 Function: Communication with supplied software Cable: Generic USB cable
Other specifications	
Ambient conditions for operation	0 to +40℃, 20 to 90% RH (no condensation)
Power requirements	IEC R14 (size C) battery × 4 or AC adapter
Power supply voltage range	4.5V - 6.8V
Current consumption* (* With sensor power supply off)	Approx. 250 mA (LCD backlight off, rated voltage 6 V) Approx. 350 mA (LCD backlight on, rated voltage 6 V)
Battery life* (* With sensor power supply off)	Alkaline batteries (LR14): approx. 15 hours continuous operation Manganese batteries (R14PU): approx. 5 hours continuous operation (at 20℃, sensor power supply off, LCD backlight off)
Dimensions, Weight	156 (W) × 174 (H) × 45.7 (D) mm (without protruding parts), Approx. 840 g

Supplied accessories		
	IEC R14 (size C) alkaline battery	4
	2-channel input conversion adapter (7-pin→BNC × 2)	1
	Data Monitoring Software	1
	16 MB CompactFlash card	1

Optional accessories Name	Model number
Waveform Recording Card	SA-78WR
Waveform Analysis Software	CAT-78WR
Printer	DPU-414
AC adapter	NC-98
Carrying Case	CF-21
BNC Adapter	VP-52C
Vibration Input Adapter	UA-03
Preamplifier for Accelerometer	VP-26C
BNC - RCA Cable	CC-24S (2.5 dia. mono plug →BNC)
Dual Channel Conversion Adapter	CC-59S01 (2.5 dia. stereo plug→dia. mono jack × 2)
Printer cable	5WCD2320
BNC - BNC Coaxial Cable	EC-90A (2 m and up)
Condenser Microphone Cable	EC-04 (2 m and up)
Accelerometer Cable	VP-51 series (2 m and up)
Accelerometer Cable (for PV-57)	VP-51K
BNC - RCA Cable	CC-24
BNC - BNC Cable	NC-39A

* Windows is a trademark of Microsoft Corporation.
* Specifications are subject to change for improvement without notice

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