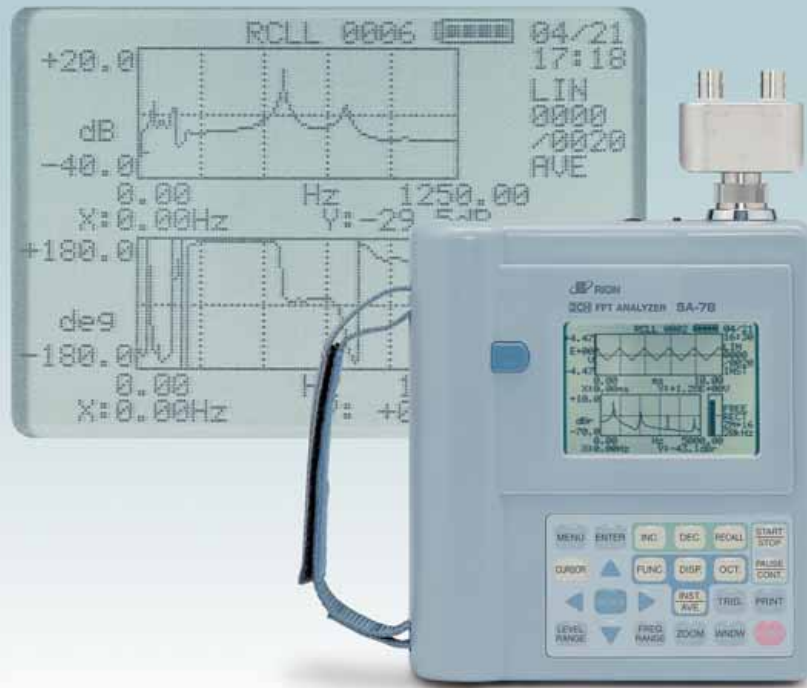RION

Smart portable unit allows transfer function measurement in the field

2-Channel Hand-held FFT Analyzer

SA-78

CE

2-Channel Hand-held FFT Analyzer

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.

- **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).**

■ SA-78 Display Screen Examples
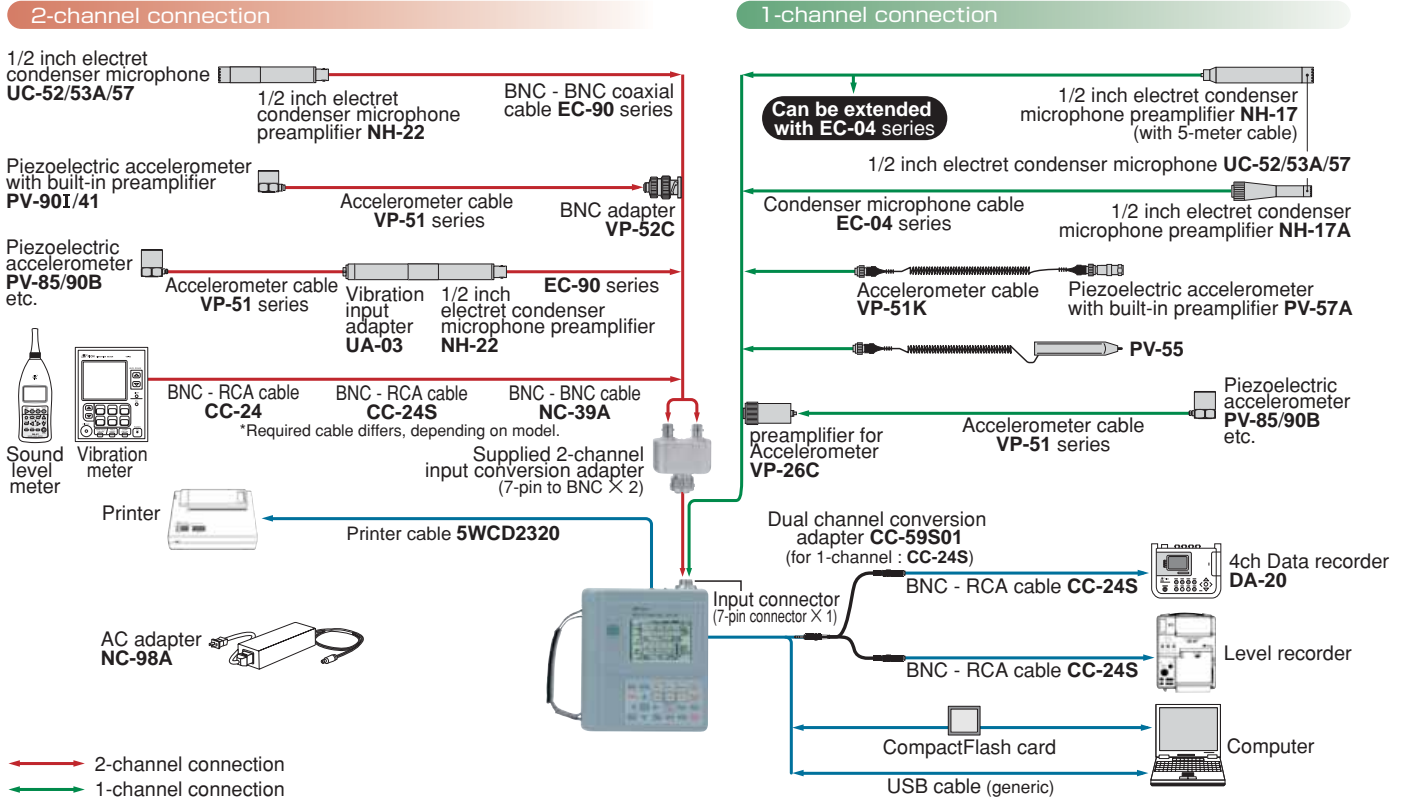
| Waveform and spectrum display | Spectrum display | 1/3 octave band display | Transfer function (amplitude, phase) display | Peak list display |

2-channel connection

1/2 inch electret condenser microphone **UC-52/53A/57**

1/2 inch electret condenser microphone preamplifier **NH-22**

BNC - BNC coaxial cable **EC-90** series

Piezoelectric accelerometer with built-in preamplifier **PV-90I/41**

Accelerometer cable **VP-51** series

BNC adapter **VP-52C**

Piezoelectric accelerometer **PV-85/90B** etc.

Accelerometer cable **VP-51** series

Vibration input adapter **UA-03**

1/2 inch electret condenser microphone preamplifier **NH-22**

EC-90 series

Sound level meter

Vibration meter

BNC - RCA cable **CC-24**

BNC - RCA cable **CC-24S**

BNC - BNC cable **NC-39A**

*Required cable differs, depending on model.

Printer

Supplied 2-channel input conversion adapter (7-pin to BNC × 2)

Printer cable **5WCD2320**

AC adapter **NC-98A**

1-channel connection

Can be extended with EC-04 series

1/2 inch electret condenser microphone preamplifier **NH-17** (with 5-meter cable)

1/2 inch electret condenser microphone **UC-52/53A/57**

Condenser microphone cable **EC-04** series

1/2 inch electret condenser microphone preamplifier **NH-17A**

Accelerometer cable **VP-51K**

Piezoelectric accelerometer with built-in preamplifier **PV-57A**

PV-55

Piezoelectric accelerometer **PV-85/90B** etc.

preamplifier for Accelerometer **VP-26C**

Accelerometer cable **VP-51** series

Input connector (7-pin connector × 1)

Dual channel conversion adapter **CC-59S01** (for 1-channel : **CC-24S**)

BNC - RCA cable **CC-24S**

4ch Data recorder **DA-20**

BNC - RCA cable **CC-24S**

Level recorder

CompactFlash card

Computer

USB cable (generic)

→ 2-channel connection
→ 1-channel connection

Waveform Recording Card SA-78WR (Option)
Integrates a time waveform recording function in the 2-Channel Hand-held FFTAnalyzer

The Waveform Recording Card SA-78WR contains optional software for the 2-Channel Hand-held 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

SA-78WR screen

Maximum recording times (using 128 MB CF card)

	100 Hz	200 Hz	500 Hz	1 kHz	2 kHz	5 kHz	10 kHz	20 kHz
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.
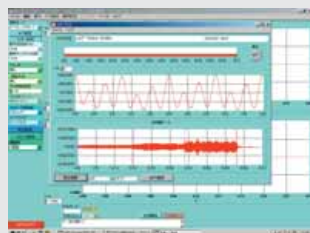
■ Specifications

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

Waveform Analysis Software CAT-78WR (Option)
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 Hand-held FFT Analyzer SA-78 in conjunction with the Waveform Recording Card SA-78WR. FFT analysis or octave analysis can be selected.
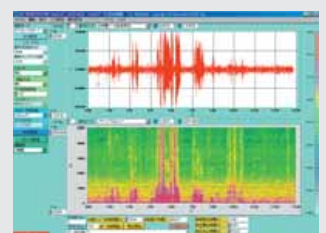
Waveform read-in screen

1/3 octave analysis screen

4-graph screen

Spectrum map screen

■ Specifications

FFT analysis		
	Frequency range	100 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz, 5 kHz, 10 kHz, 20 kHz
	Number of sampling points	64 to 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	IEC 61260-1995 Class 1 JIS C1514:2002
	Analysis frequency	1/1 octave 0.5 to 8 000 Hz（15 bands） 1/3 octave 0.4 to 10 000 Hz（45 bands） 1/12 octave 0.36 to 11 000 Hz（180 bands）
	Averaging functions	Linear, exponential, maximum hold
	Display functions	Bar graph, numerical list

■ 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 to 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 Hz, 200 Hz, 500 Hz, 1 kHz, 2 kHz, 5 kHz, 10 kHz, 20 kHz, 50 kHz, 80 kHz
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 8 000 * 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 to 32 × (depending on FFT zoom ratio) Other: 1 to 16× (depending on FFT zoom ratio)
	Y axis	Linear display: 1 to 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. 4 000 (zoom ratio ×1, using supplied 64 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 to 6 V, LOW level 0 V)
Printer port	Connector type: 9-pin D-sub, male Transfer principle: RS-232C, 9 600 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	4.5 V to 6.8 V
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	174 (H) × 156 (W) × 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 to BNC × 2) × 1 Data Monitoring Software × 1 64 MB CompactFlash card × 1

■ Option

Optional accessories Name	Model number
Waveform Recording Card	SA-78WR
Waveform Analysis Software	CAT-78WR
Printer	DPU-414
AC adapter	NC-98A
Carrying Case	CF-21
BNC Adapter	VP-52C
Vibration Input Adapter	UA-03
Preamplifier for Accelerometer	VP-26C
BNC - RCA Cable	CC-24 (2.5 dia "hooked" plug to BNC plug)
BNC - RCA Cable	CC-24S (2.5 dia "straight" plug to BNC plug)
Dual Channel Conversion Adapter	CC-59S01 (2.5 dia. plug to 2.5 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-57A)	VP-51K
BNC - BNC Cable	NC-39A

ISO 14001 RION CO., LTD.
ISO 9001 RION CO., LTD.

Distributed by: