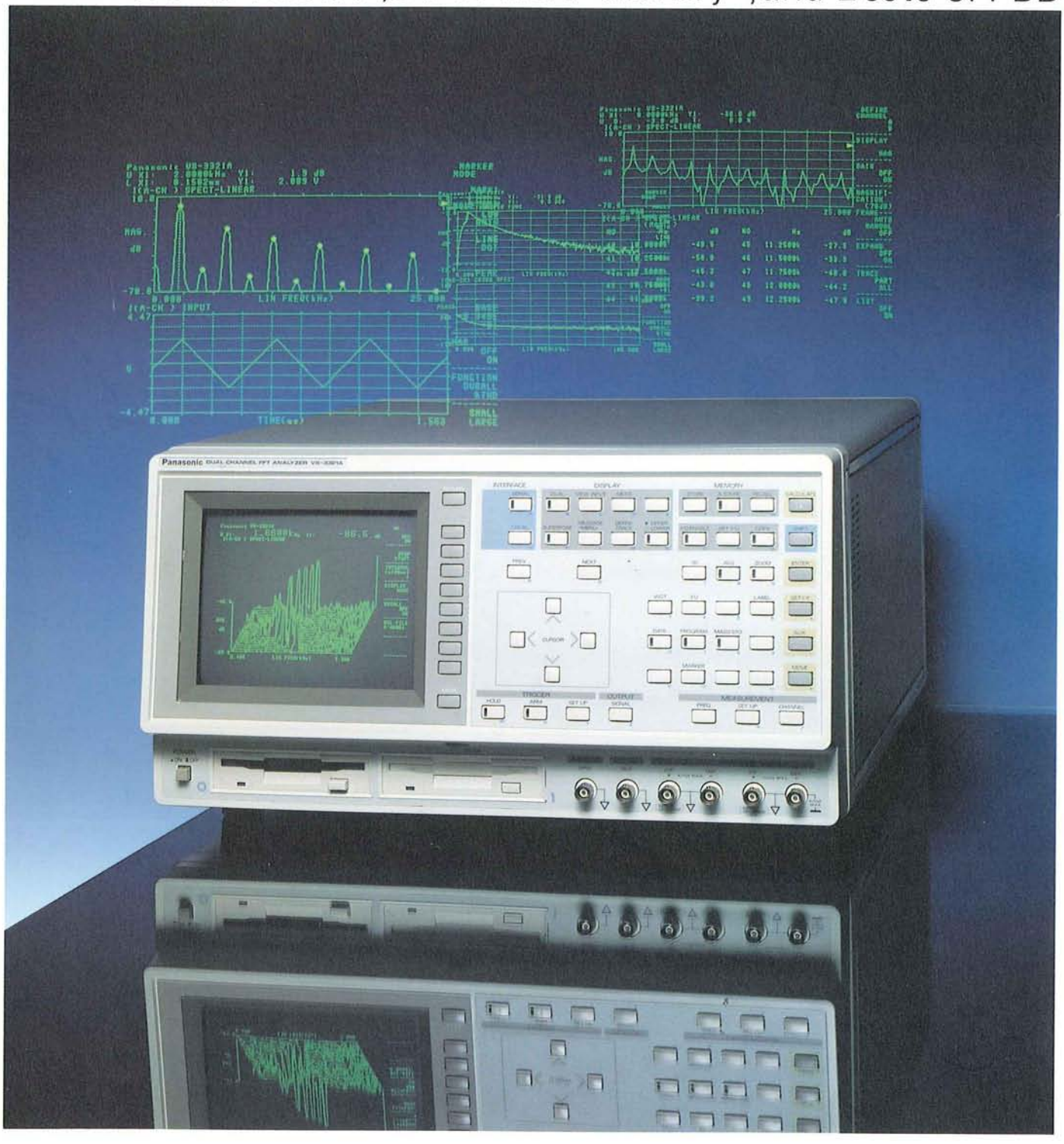
Panasonic®

2 Channel FFT Analyzer

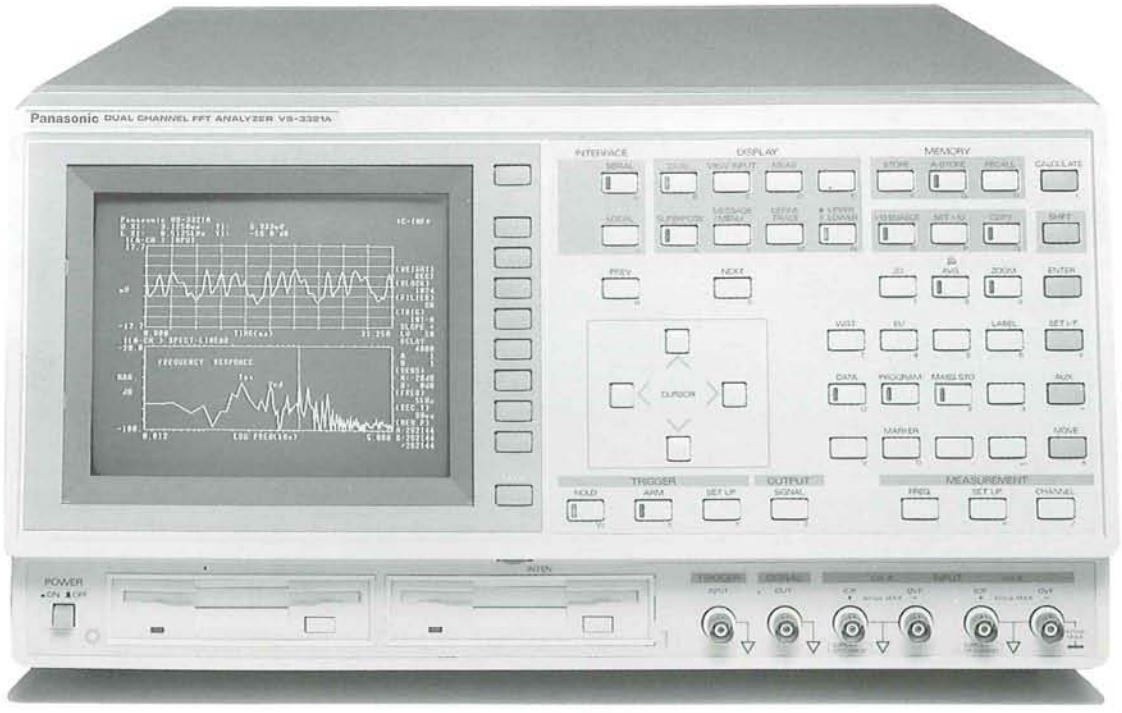
VS-3321A

GP-IB

DC to 200kHz, 512K word memory , and 2 sets of FDD



New generation 2CH FFT Anal



General

The FFT analyzer is a realtime signal analyzer using the Fast Fourier Transform (FFT) function.

The VS-3321A has two inputs so that the transfer function and cross-correlation between two input signals can be measured. Applications include frequency characteristics measurement of an amplifier or a filter, acoustic measurement of a speaker or a microphone, and the noise and vibration analysis of a motor or machinery.

Compared to the conventional FFT analyzer, the VS-3321A was improved on the features, functions, and operational procedures, so it is effective for developing electric equipment and solving the noise or vibration problems.

Features

1. Adoption of Set-up menu system
   Combined with Auto range and Auto display functions, it is possible to analyze a complicated waveform with a simple key operation.

2. Two sets of FDD as a standard
   The FFT analyzer incorporates an editing function to file only necessary data.

3. DC to 200 kHz of wide frequency band and 800 lines of high resolution frequency spectra (only in 1ch. In 2 ch, the values are DC to 100 kHz and 800 or 400 lines.)

4. 256 K word × 2 ch of large memory capacity is a standard feature.
   It is possible to store acoustic signals of up to 20 kHz for 5 seconds continuously.

5. Two types of frequency resolution zoom functions are standard.
   2 to 200 times real time zoom
   2 to 100 times stored zoom

6. Three-way, three-dimensional display helpful for signal analysis.

7. Waveform creation function
   Users can create a desired waveform as a frequency filter in Inverse FFT or as a reference waveform in the YES/NO decision function

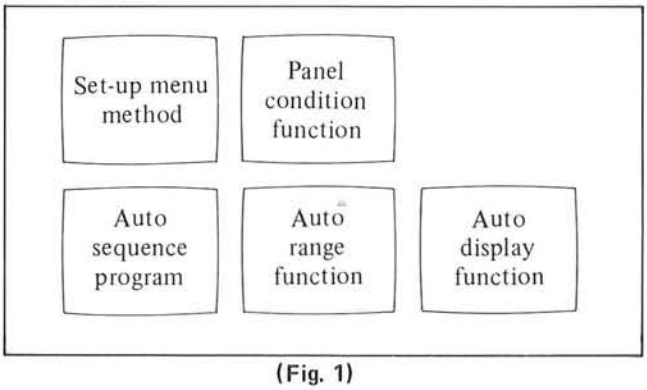
8. Max. 128 times vertical magnifying function

yzer with state-of-the art functio

1. Easy to operate (Fig. 1)

The VS-3321A adopts a Set-up menu system which allows the specification of input and analysis conditions while observing an input waveform. These conditions can be stored on a floppy disk so that you can set conditions with simple key operation when necessary. Measurement conditions can be executed automatically by an Auto sequence program instead of manual operation.

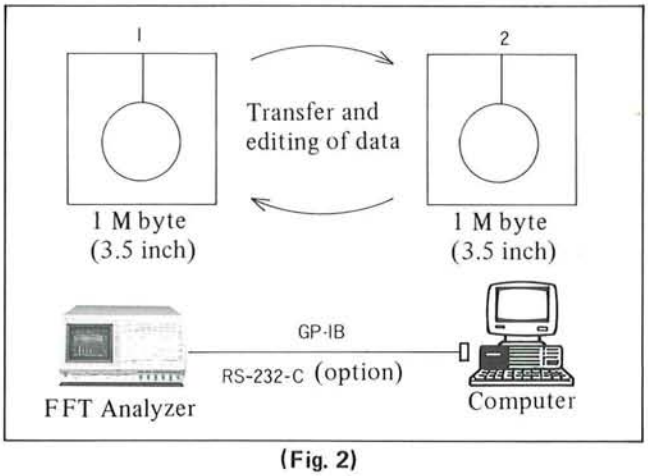
Additionally the Auto range function specifies an adequate sensitivity automatically depending on the input signal. The Auto display function automatically scales the display for clear viewing resulting in easy operation.



(Fig. 1)

2. Two sets of built-in FDD (1 M byte x 2 sets) (Fig. 2)

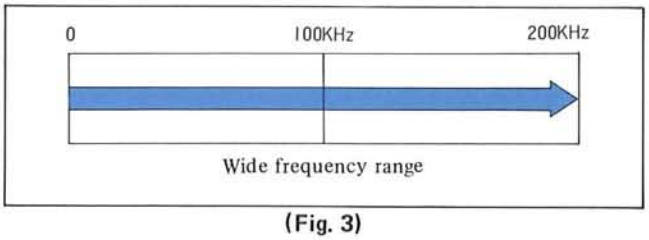
The two FDDs can store data, transfer data between each other and edit the data easily. In addition, Remote control function by GP-IB or RS-232-C is available.



(Fig. 2)

3. Wide frequency band, DC to 200 kHz (Fig. 3)

Up to 200 kHz of frequency band can be analyzed in the 1 ch mode.



(Fig. 3)

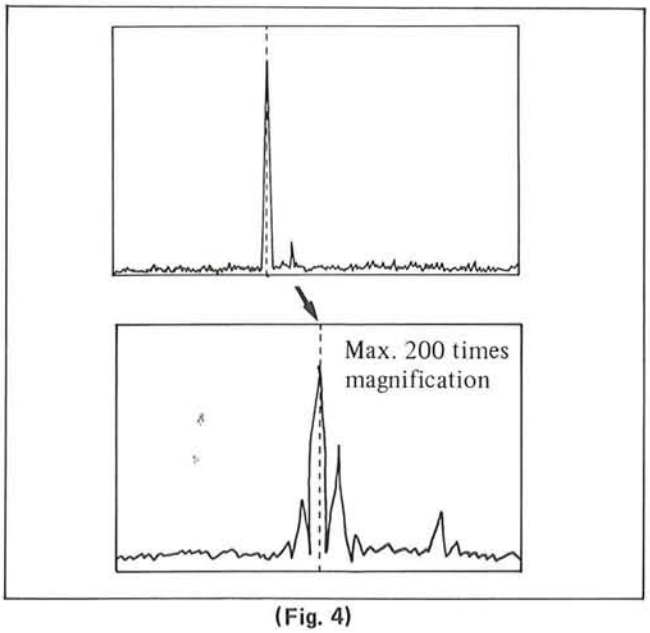
4. The large capacity of memory, 512 K word is standard. It is helpful for voice and vibration analysis.

256 K word × 2 ch of input memory is provided as a standard. For example, up to 20 kHz of voice signals can be stored for 5 seconds. This memory is powerful for voice analysis and long-term vibration measurement.

5. Max. 200 times of Zoom function for magnifying frequency (Fig. 4)

2 to 200 times high-speed realtime zoom function is provided by a digital filter.

Combined with the large capacity of memory, 2 to 100 times stored zoom function is available. Users can select one of two zoom functions depending on their needs.



(Fig. 4)

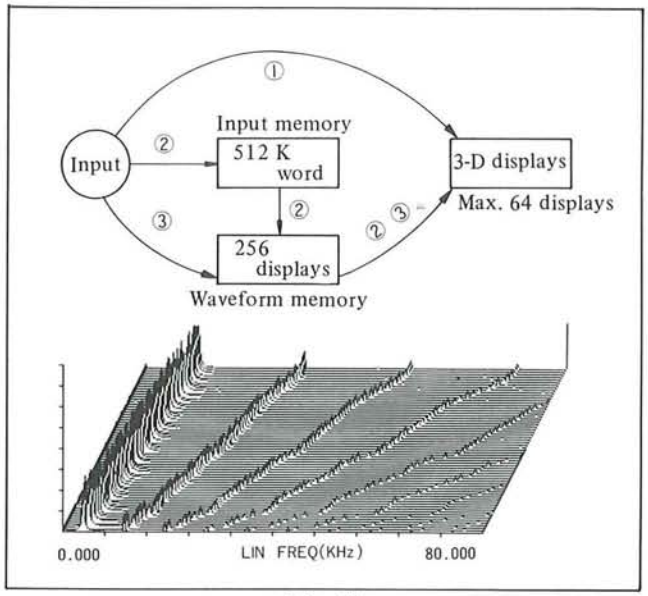
ns

6. Three-way three-dimensional displays (Fig. 5)

① Direct three-dimensional display
Analysis result of the input signal enables a direct three-dimensional display.
(Internal timer is available, too)

② Equivalent realtime three-dimensional display
Voice data is once stored in the input memory. Then, frequency spectra shifted by a specified short time (ΔT second) from a desired point is analyzed. ΔT in the voice analysis is selected among the range of 20 μs to 20 ms, which enables high-speed realtime frequency analysis.

③ Three-dimensional display of specified data only
Only a necessary signal can be stored in the multipurpose memory and displayed in a three-dimensional format.
For example, only abnormal data checked by the YES/NO decision function can be stored and displayed simultaneously.
In ② and ③ displays, the desired part of a waveform can be magnified with a cursor and displayed in a three-dimensional form.



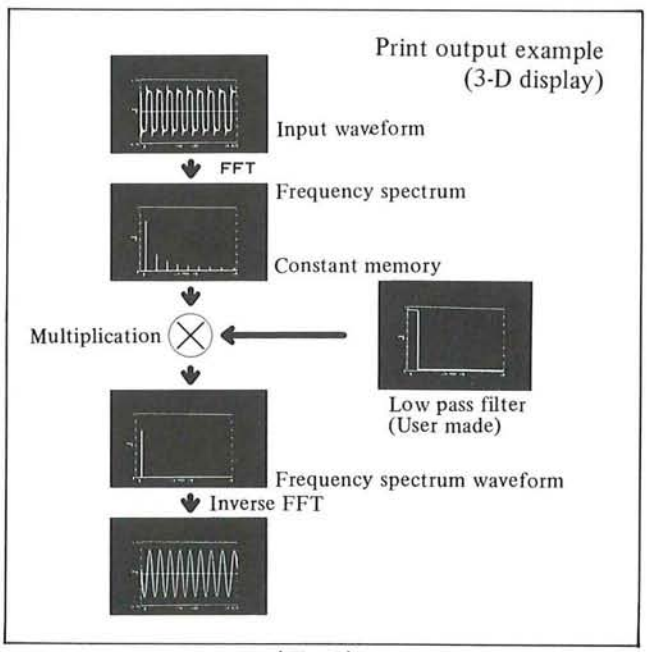
(Fig. 5)

7. Waveform creation function (Fig. 6)

The waveform creation function is provided to create any waveform that a user desires. This includes two applications.

① As a frequency filter or a time filter
Combined with Inverse FFT function, users can change any part of the input signal and it can be re-displayed as a time domain signal.

② As a reference in the YES/NO decision function
Comparing a time domain waveform, a frequency domain waveform, or a histogram waveform with the reference waveform, the result can be displayed on the screen.



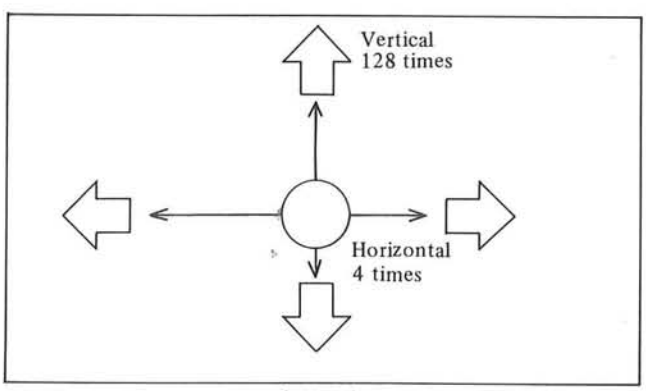
(Fig. 6)

8. Max. 128 times vertical magnifying function effective for analyzing low-level signals (Fig. 7)

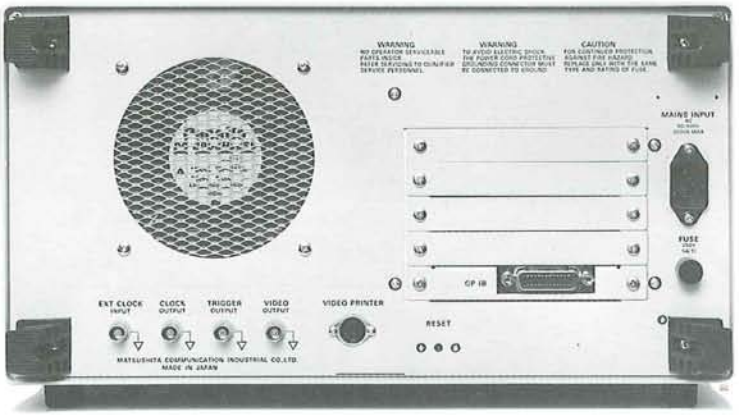
In the frequency analysis of a low-level signal such as noise and mechanical vibration, the displayed waveform is too small to observe accurately when the vertical axis is measured by the linear scale.

This is because the waveform has scattered frequency characteristics, even if the waveform is near the upper limit of the input range.

The vertical Magnifying function allows Max. 128 times magnification so that it is possible to capture and analyze such a low-level signal.



(Fig. 7)



Specifications

Analysis function

Time range	Input waveform (observation of transient waveforms and memory waveforms) Auto correlation factor and Cross-correlation factor Inverse FFT waveform and Impulse response, Cepstrum
Frequency range	Linear spectrum, Phase spectrum, Power spectrum, Power spectrum density, Energy spectrum density, Cross spectrum, Transfer function (Bode diagram, Nyquist diagram), Coherence, Coherent output power (C.O.P.) 1/1 octave analysis and 1/3 octave analysis
Amplitude range	Histogram

Input

Input channel	2 channels
Input impedence	1 MΩ ± 5 %
Input coupling	DC or AC coupling
Input system	Differential input / Single ended input
Input range	Manual range / Auto range −40 dBV to +30dBV F.S. (Every 10 dB step, 8 steps switching)
Max allowable input voltage	100 V
Max floating voltage	42 V
Input filter	Built-in anti-aliasing

Input range (dB)	Input voltage range (transient value)
+30	+44.7 V to −44.7 V
+20	+14.1 V to −14.1 V
+10	+4.47 V to −4.47 V
0	+1.41 V to −1.41 V
−10	+447 mV to −447 mV
−20	+141 mV to −141 mV
−30	+44.7 mV to −44.7 mV
−40	+14.1 mV to −14.1 mV

Analysis section

Number of sampled data	1024 or 2048 data selectable
Sampling rates	2.56 times as wide as the frequency range selected or externally applied by sampling signal of up to 200 kHz
Ext. sampling signal	Amplitude: ± 0.5 V to ± 10 V
Dynamic range	70 dB
Weighting	Rectangular, Hanning, Flat top, or User-defined window

Waveform analysis

Frequency range	1 ch: DC to 200 kHz 2 ch: DC to 100 kHz
Spectrum lines	1 ch: 800 lines 2 ch: 400 lines, 800 lines
Zoom	Realtime zoom: 2 to 200 times Stored zoom: 2 to 100 times

Frequency range	Resolution	Max. storage time
1 Hz	1.25 mHz	28°26'40"
2	2.5 mHz	14°13'20"
5	6.25 mHz	5°41'20"
10	12.5 mHz	2°50'40"
20	25 mHz	1°25'20"
50	62.5 mHz	2,048"
100	0.125 Hz	1,024"
200	0.25 Hz	512"
500	0.625 Hz	204.8"
1 K	1.25 Hz	102.4"
2 K	2.5 Hz	51.2"
5 K	6.25 Hz	20.48"
10 K	12.5 Hz	10.24"
20 K	25 Hz	5.12"
50 K	62.5 Hz	2.048"
100 K	125 Hz	1.024"
200 K	250 Hz	0.512"

NOTE: The frequency resolution in 400 lines is twice of the above.

Memory

Input data memory	256 K words (512 K byte) × 2
Waveform memory	100 displays (memory) 340 displays (floppy disk)
Floppy disk	1 M byte × 2 sets (standard)
Panel condition memory	Loaded from floppy disk freely
Auto sequence program	Loaded from floppy disk freely

Triggering

Triggering mode	Free run / Hold, Arm / Auto Arm
Triggering source	Internal (input signal A ch / B ch), External
Triggering level	± 100 % of full scale (1 % step)
Triggering slope	Rise (+), Fall (−)
Triggering delay	Any point of input data memory (256 K word)

Averaging

Averaging mode	Simple addition: input waveform, frequency spectrum, and histogram Exponential weighted average, Peak hold: frequency spectrum
Averaging times	2 to 9999 in increment of 1
Overlap averaging	ON, 50 %, OFF

Arithmetic operation

Calculation	Addition, Subtraction, Multiplication, Division, Differentiation, Integration, and Constant setting
Waveform creation	Creates a desired waveform by using a cursor
Inverse FFT	Observation of input waveform after passing through the specified frequency filter

Display

Display system	Raster scan system
Display contents	Analysis result waveform + measurement condition, Data list display
Display function	3-dimensional display, Dual display, Superposed, Grid display
Cursor mode	*Main cursor Vertical axis: V, V^2, V^2/Hz, V^2·S/Hz, dB, %, deg Horizontal axis: Hz, s, V *Reference cursor Displays the difference with the main cursor *Auto peak search Displays the maximum value of the screen Displays the total value of data between two cursors *Vertical axis Linear scale 2 to 128 times, Log scale 10 to 80 dB full scale, 10 dB step × 7 *Horizontal axis 4 times magnification

Input / Output

Interface	GP-IB, RS-232-C (option)
Hard copy	Plotter output (HP-GL), XY recorder output (option), video printer output
Signal output	Impulse signal, Random noise output
Others	Internal sampling signal output, External trigger signal input, Internal trigger signal output

Options

VR-0321A	RS-232C interface card
VR-0322A	Analog output card
VR-0323A	YES/NO decision output card

Power supply

Voltage range	AC 90 to 132 V 50 / 60 Hz
Power consumption	350 VA

Dimensions 427(W) × 221(H) × 560(D) mm (17 × 9 × 22 inch)

Weight 25 kg (55 lbs)

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