

Smart RealWave Analyzer

Portable Vibration Analyzer for CMS



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SV Corporation

I. INDUSTRIAL PDA

SPEC

Industrial PDA Specification



Front



rear

SYSTEM	
Operation System	WinCE 5.0
CPU	PXA320 (806MHz)
LCD	3.5" 240 * 320 TFT-LCD + TSP
MEMORY	
Flash	NAND 128MB
System Memory	DDR SDRAM 128MB
AUDIO, SLOT & PORT	
Audio Codec	AC' 97 Codec
Speaker Amp	1W
External Memory Slot	SD/MMC Slot
USB	1 Host, 1 Device
INPUT/OUTPUT DEVICES	
I/O	Head-Phone, Speaker, LED, Power etc.
KEY	Power, Reset, Menu, Navi etc.
GENERAL COMMUNICATION	
Communication	Serial, WiFi
POWER	
Battery	Lithium Polymer 4000mAh (Removable)
Battery Charger	Built-in battery charger
Power	5V, 3A
Environment	
International Protection	IP64
Operating Temperature	-20°C ~ 50°C (-4°F ~ 122°F)
Storage Temperature	-40°C ~ 70°C (-40°F ~ 167°F)
Humidity	5% ~ 95% Non-condensing
More options	
Option	3M CMOS Camera, 1D Bar-Code Scanner, IR Temperature Sensor, Laser RPM Sensor

II. Data Acquisition Board

SPEC

Data Acquisition Board Spec



ITEM	DAQ SPEC
A/D Converter	24 Bit
Input Channel	1 ~ 3 Channel, Tacho
Sensor Type	IEPE, AC, RPM, IR Temperature Sensor
Sampling Frequency	32,768Hz or 51,200Hz
Input Range	$\pm 5V(\text{peak})$ or $\pm 2.5V(\text{peak})$
Dynamic Range	17 ~ 134dB (50mV/Pa x 10Gain) 37 ~ 160dB (50mV/g x 10Gain)
Input signal amplification	2, 4, 8, 16, 32, 64
SNR	100dB More
Frequency Range	0.5 ~ 16kHz(3dB) or 0.5 ~ 20kHz(3dB)
Temperature	-10 ~ 50°C

System-specific software options

STD : BASIC, OPT : OPTION, N/A : NOT

SOFTWARE \ DAQ	1-Channel			2-Channel		3-Channel		
	General	ENV.	CMS	General	CMS	CMS	Ship Vibration	ENV. Vibration
Time Signal Record	STD	STD	STD	STD	STD	STD	STD	STD
Listening ability	STD	STD	STD	STD	STD	STD	STD	STD
VLM	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT
SLM	OPT	OPT	OPT	OPT	OPT	N/A	N/A	N/A
FFT	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT
Spectrogram	OPT	OPT	OPT	OPT	OPT	OPT	N/A	N/A
RPM	OPT	OPT	OPT	OPT	STD	OPT	N/A	N/A
TEMP	N/A	N/A	N/A	OPT	OPT	OPT	N/A	N/A

III. Vibration Measurement Software

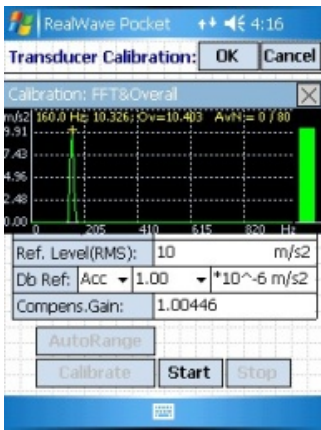
PA101: 1-Ch Vibration Analyzer

BASIC FEATURES

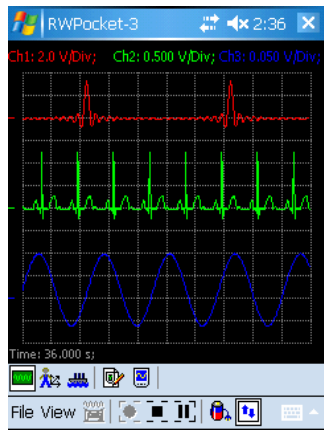
- ◆ IEPE Accelerometer, IEPE MICROPHONE connection
- ◆ Time signal recording and playback features (Wave file)
- ◆ Real-time listening features in measurement mode (Head phone option)
- ◆ Sensor calibration : The sensitivity gain, auto-calibration by software
- ◆ Input signal amplification : 1, 2, 4, 8, 16, 32, 64 Times
- ◆ Auto scale (Y Axis) adjustment and peak detection
- ◆ Start measuring the time delay function (pre-trigger)
- ◆ Measurement frequency range: 0.5-16kHz
- ◆ Sampling frequency: 32768Hz
- ◆ Dynamic range over 100dB
- ◆ 1Hz, 10Hz using high-pass filter selection
- ◆ Vibration signal for RMA, Peak, Peak to Peak, Min, Max can be set
- ◆ Input function measurement information
- ◆ Measurement configuration file, save and call
- ◆ FFT data storage and analysis (ref file feature)
- ◆ Wave call and specify the domain analysis
- ◆ Data output: Text, Excel, Matlab, BMP, JPEG
- ◆ Input transient detection and alerts
- ◆ Time Signal save (Wave file type) : PDA memory or SD memory (save successive 1 hour interval, Max 18 hours save at 4GB)
- ◆ Using SD memory or USB for data transmission
- ◆ Start/stop time preset, Average time preset
- ◆ Time constant 35ms, 0.125ms, 1sec etc can enter any value
- ◆ Real-time frequency analysis (FFT) : Max 2000 line resolution



Set time zone
(1/2 Channel)



Sensor Calibration
(1/2 Channel)



3 Channel Oscilloscope

Vibration Level Meter (VLM)

- ◆ Filter : High-pass Filter(1, 5, 10Hz, 100Hz~15KHz cutoff)
- Band-pass Filter(0.5~300Hz, 2Hz~1kHz, 10~500Hz, 10Hz~1kHz cutoff – ISO 10816)
- Band-limit Filter(1.6kHz, 200Hz, 100Hz cutoff)
- ◆ 3 Detectors : Acceleration, Velocity, Displacement, Simultaneous display
- ◆ Display : 3 Detectors simultaneous display digital value and time trace graph
- ◆ Integration time and time constant adjustment
- ◆ Measure Value : RMS, Peak, Peak-to-Peak, Min, Max Value Output
- ◆ Unit : Acceleration m/s^2 , cm/s^2 , mm/s^2 , $\mu m/s^2$, g, dB
- Velocity m/s, cm/s, mm/s, $\mu m/s$, dB
- Displacement m, cm, mm, μm , dB
- ◆ Measure result and Real-time save and play of wave file
- ◆ Time constant : 35ms, 0.125ms, 1sec etc. Random value input available



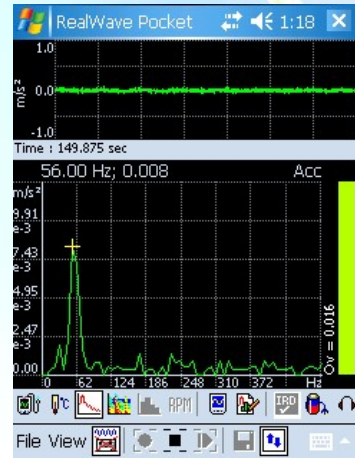
VLM Measure Mode

III. Vibration Measurement Software

FFT / Hearing / PC/ Sound Level Meter [Optional]

Frequency Analysis(FFT)

- ◆ Frequency : 100Hz ~ 16kHz Choice
- ◆ Buffer size : 256, 512, 1024, 2048, 4096 Choice
(Max 2000 Lines)
- ◆ Windowing : Rectangular, Hanning, Flattop
- ◆ Averaging : Linear, Exponential, Peak
- ◆ Calibration weights : A, B, C, D, E
- ◆ High Pass Filter : 5, 20, 100Hz
- ◆ Automatic peak detection function, and Y-axis Auto scaling
- ◆ Harmonic cursor feature
- ◆ Postprocessor : Frequency band, Buffer size, Window, Averaging,
Variables such as weight compensation adjustment calculated in
accordance with Post-FFT Support



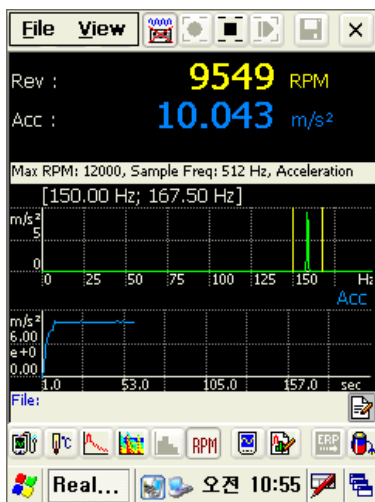
FFT

PC Software [Standard]

- ◆ Time trace data display
- ◆ Octave data graph display
- ◆ FFT data graph display
- ◆ Text data display
- ◆ PC-based play feature (Wave file)
- ◆ Peak Auto-search Feature in time trace selection
- ◆ Data management and reporting feature through project
conversion of measurement



PC Software



Simultaneously measure RPM & vibration



Sound measurement in rotational machinery

Hearing SYSTEM

- ◆ Real-time FFT, Spectrogram,
FFT based Octave, Digital
Filter based octave, VLM,
SLM in real-time listening mode

Sound Level Meter (SLM) [Optional]

- ◆ Standard : IEC61672-1 Class1, IEC60651 Type1
- ◆ Frequency range : 0.5 ~ 20kHz
- ◆ High-pass filter : 1Hz, 20Hz
- ◆ Frequency calibration : A, B, C, Z
- ◆ Time calibration : Fast, Slow, Impulse
- ◆ Time constant : 0.125, 1, 2, 5, 8 Sec
- ◆ Integral time : 0.125, 0.25, 0.5, 1, 2, 5, 10 Sec

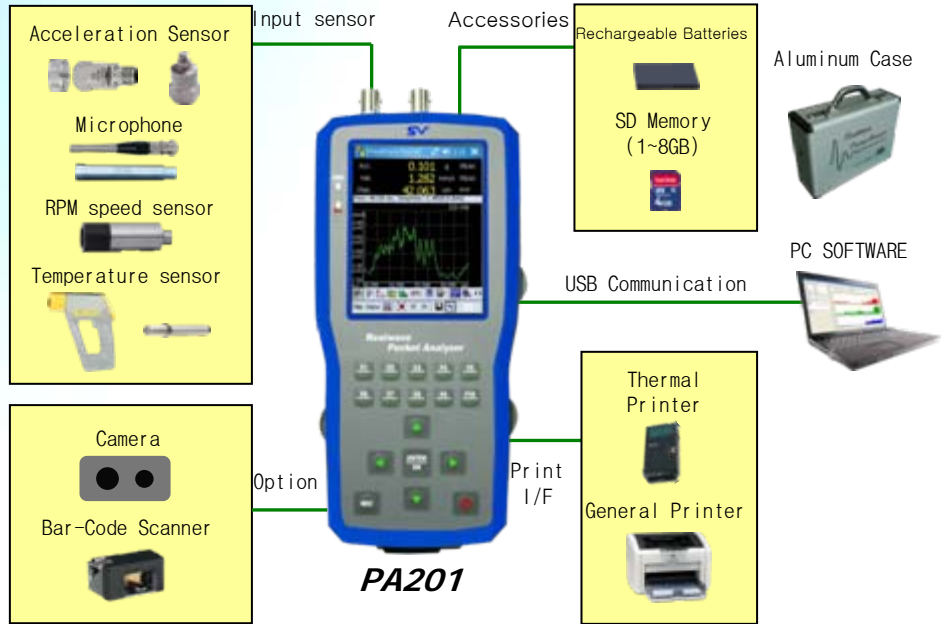
IV. Vibration, RPM, and Temperature Measurement

PA201: 2-Ch VLM / FFT / BALANCING for CMS

PA201

SMART
DIAGNOSTIC
EQUIPMENT.
FFT.
BALANCING.

SYSTEM CONFIGURATION



MAIN FEATURE

- ◆ Acceleration Sensor, Microphone, Temperature, RPM Signal Input
- ◆ Infrared temperature sensor input(DC Voltage) available
- ◆ Laser type RPM sensor input available
- ◆ Using a barcode scanner product information and measurement data can be synchronized
- ◆ Using a digital camera take picture about measurement location and surrounding circumstance can be synchronized with measurement data
- ◆ Development, Manufacturing facilities, rotating machinery, automotive, consumer product used in the diagnosis
- ◆ IRD 810 Filter apply, Human vibration filter(ISO 8041) apply
- ◆ Crest Factor calculation
- ◆ Bode Plot, Orbit
- ◆ Balancing feature option
- ◆ Real-time spectrogram analysis (Time-Frequency-Level)

SOFTWARE OPTION

- ◆ Vibration Level Meter (VLM)
- ◆ IRD 810 filter mode / ERP support
- ◆ Temperature display feature
- ◆ Frequency feature (FFT)
- ◆ FFT-based octave analysis (OCT)
- ◆ Digital filter-based octave analysis (DOCT)
- ◆ Spectrogram analysis (SPEC)
- ◆ FFT-based revolution measurement (RPM)
- ◆ Sound Level Meter (SLM)
- ◆ Balancing (BAL)

VIBRATION LEVEL METER (VLM)

- ◆ Sampling frequency : 32768Hz, 4096Hz, 1024Hz, 512Hz, 256Hz
- ◆ Filter : IRD810 emulation filter 5.8-2kHz & 23-10kHz

Accelerometer and Cable



Description	Coiled cable, black polyurethane, lightweight .175 OD, AWG=24.
Max Temp	250°F (121°C)
Cable Diameter	.170 in (4 mm)
Cable Jacket	Black Polyurethane, Light Weight, Coiled



Description	Multi-Purpose Accelerometer, Top Exit Connector / Cable, 50 mV/g
Sensitivity	50 mV/g
Frequency Response (±3dB)	60-750,000 CPM
Dynamic Range	± 100 g, peak
Max Temp	121°C

V. Measurement & Analysis SOFTWARE (2Channel)

RPM / IRD / Temp / Balancing / Spectrogram

RPM MEASUREMENT (RPM)



- ◆ Using Laser sensor RPM measurement
- ◆ Measurement distance : 0.05 ~ 2m
- ◆ Measurement range : 10Hz ~ 16kHz (1,000,000rpm)
- ◆ Output : 0.1 ~ 5VDC
- ◆ Size : Ø22 x 50mm
- ◆ Temperature range : -10 ~ +60°C
- ◆ Simultaneous vibration and RPM display option (customized)

IRD 810 FILTER MODE (ERP SUPPORT)

- ◆ Through analog circuit characteristics reinterpretation and mathematical modeling of existing IRD810 device, transplanted into a digital filter type algorithm vibration emulation mode support
- ◆ FFT date output combination process support
- ◆ ERP client software development support available

TEMPERATURE MEASUREMENT (TEMP)

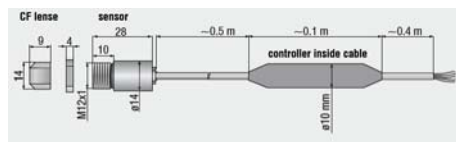
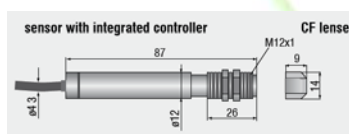
- ◆ It is connecting either infrared thermometer or sensor after receiving DC output signal. so it can be temp measurement & display function.
- ◆ Temperature save function
- ◆ Sensor can be connected directly to the power supply (5VDC)
- ◆ Measurement range : -20 ~ 350°C or -30 ~900°C
- ◆ It can be used up to 75°C or 125°C without cooling system
- ◆ Fast sampling speed: 30ms or 10ms
- ◆ Spectral range : 8 ~ 14 μ m
- ◆ Output : 0 ~ 5VDC
- ◆ IP65 (NEMA-4) support



IRD 810 Filter mode (ERP support)



Temp measurement (Infrared thermometer)



Non-contact infrared temperature sensor

BALANCING (BAL)

- ◆ Input : RPM 1 channel, vibration 1 channel
- ◆ Balancing speed : 120 ~ 60,000 RPM
- ◆ 1 Plane balancing
- ◆ Characteristic :
Summary of calibration weights, balancing on a fixed position correction
2 fixed-weight calculation for the angular position,
DIN ISO 1940 quality assurance standards based on the balancing,
Vibration evaluation according to DIN ISO 10816-3 standard.
- ◆ Frequency range: 0.5 ~ 16kHz
- ◆ Dynamic range: more than 100dB
- ◆ Measurement range : Vibration acceleration 500m/s² (p-p)
Vibration velocity 500mm/s (p-p)
Vibration displacement 500 μ m (p-p)
Reference 159.15Hz
- ◆ Measurement : Vibration acceleration, vibration velocity, vibration displacement, bearing diagnostics, temperature, rotation speed
- ◆ Signal : Spectrum (amplitude, Envelope), Time signal, Coast Down Curve
- ◆ Accessibility : Laser RPM sensor, vibration acceleration sensor

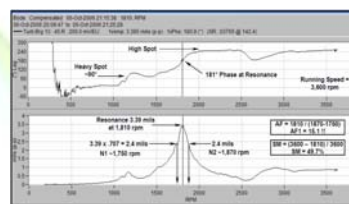


SPECTROGRAM ANALYSIS (SPEC)

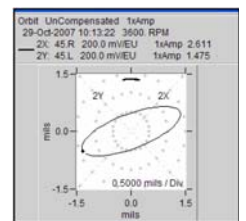
- ◆ Frequency : Choice of 100Hz ~ 16kHz
- ◆ Buffer size : Choice of 256, 512, 1024, 2048, 4096 (Max 2000 line)
- ◆ Window : Rectangular, Hanning, Flattop
- ◆ Calibration weight : A, B, C, D, E
- ◆ Display :Time(X)-Frequency(Y)-Amplitude(Z:Color-Coded)

Others

- ◆ Bode Plot
- ◆ Orbit



Bode Plot Diagram



Orbit Analysis

VI. 3-Channel Vibration Analyzer

PA301: 3-Ch for CMS

Frequency Band

◆ 8 KHz each channel

VII. Low Frequency Accelerometer

Building, Bridge, Power plant, and Nuclear power plant diagnosis
Structural Analysis, Ground Vibration, Earth quake Measurement

3 axis vibration sensor



General features

- ◆ 3 axis vibration sensor (MEMS type)
- ◆ Included power supply unit for MEMS sensor (MSPS) or without MSPS
- ◆ Low power consumption
- ◆ Operating temperature range : -40 ~ +85°C
- ◆ Power : 8 ~ 32V DC Power
- ◆ Output : $\pm 4V$ differential output or 0.5 ~ 4.5V single ended output
- ◆ Low Impedance: no influence by cable length
- ◆ Low noise performance
- ◆ Rugged Anodized aluminum module
- ◆ Serialized for Traceability
- ◆ Non Standard g Range Available

SPECIFICATION

Model	input range	Freq. range	Sensitivity	Output noise (RMS)	max shock
단위	g	Hz	mv/g	$\mu\text{g}/\text{Hz}^{1/2}$	g
MA301-002	± 2	0 ~ 400	2000	13	2000
MA301-005	± 5	0 ~ 600	800	32	
MA301-010	± 10	0 ~ 1000	400	63	
MA301-025	± 25	0 ~ 1500	160	158	
MA301-050	± 50	0 ~ 2000	80	316	
MA301-100	± 100	0 ~ 2500	40	632	
MA301-200	± 200	0 ~ 3000	20	1265	
MA301-400	± 400	0 ~ 4000	10	2530	

Parameter	general	Max.
Cross Axis Sensitivity (%)	2	3
Bias Cal. Error (% of span)	-002	2
	-005 thru -400	2
Bias Temp. Shift (ppm of span/°C)	-200	100
	-005 thru -400	50
Non-linearity [-90 ~ 90% of full span] (% of span)	-002 thru -050	0.15
	-100	0.25
	-200	0.40
	-400	0.70

Smart Analyzer
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