Video Measurement System VSA

0 MHz to 9 MHz

Compact platform for video signal analysis: measurements of all relevant video parameters in the baseband, graphic and numeric result display, vector and waveform display

Photo 41802

Brief description

Video Measurement System VSA from Rohde & Schwarz combines the functions of a video analyzer, vectorscope, oscilloscope, monitor and controller (PC) in a 19" desktop.

Fields of applications are
- laboratory and service
- automatic test and monitoring systems
- production and quality assurance

The instrument features convenient operation as well as high measurement accuracy and speed. The compact design makes it also suitable for mobile applications. Thanks to the great number of integrated functions and system interfaces the VSA is an essential tool for measurements and system applications in all fields of video.

In addition to the versatile measurement capabilities provided, the modular software and hardware configuration offers sufficient capacity for future expansions.

Main features

- Four loopthrough video signal inputs with analog 9 MHz bandwidth
- DOS- and Windows-compatible PC with IEC/IEEE-bus controller
- Multitasking operating system
- Connectors for external keyboard and colour monitor
- Monochrome graphic LCD display with 640 x 480 pixels or colour LCD
- Two serial interfaces
- SCPI remote control via IEC/IEEE or serial interface
- Printer interface
- 3.5" floppy disk drive (DOS format) for result transfer and software options
- Hard disk
- Modular design with hardware and software options

Five instruments in one

Video and FFT analyzer
- Simultaneous computation of up to **150 different signal parameters**
- Automatic limit monitoring
- Automatic overall measurement of all parameters
- Individual measurements using extended test capabilities
- Test-signal and test-location display
- Standard or reference measurement for each parameter separately

3-channel oscilloscope
- Simultaneous display of up to three video signals in separate displays
- Separate test input for each part display (eg components, RGB, YC_BC_R)
- Simultaneous display of the same signal with different time scales in up to three separate windows
- Displayed signal section variable in the x and y direction from approx. 200 ns to 20 ms
- Digital filters for simulating signal manipulations, eg all CCIR filters for insertion signal measurements
- Scale automatically matched to the display
- Two cursors for each window: LEVEL, PEAK, SLOPE and PULSE functions allow analysis of complete signal elements
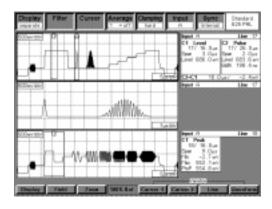
Fig. 1: With a single sin x/x measurement the result display is divided, one part showing the amplitude frequency response and the other the group delay. An info and a cursor window are assigned to each spectrum.

Fig. 2: In the list mode, selected video parameters and their measured values are displayed in the form of a list.

Fig. 3: In the SCOPE mode the screen is divided in a signal, an info and a cursor window. The waveform of one video signal can be displayed simultaneously in up to three windows with continuously variable time and amplitude scaling.

Fig. 4: In the vectorscope function the magnitude and phase of all colour parameters of a video line are shown in a graphics display; the line is also displayed in the waveform window. A cursor line in the waveform display of the video line marks the measurement time for colour subcarrier amplitude and phase. The cursor corresponds to one or two markers in the vector diagram. When the cursor line is shifted, the markers track the vector curve.

Vectorscope

- Graphic display of all colour parameters of a video line in magnitude and phase
- Accurate measurement of phase difference of two colour signal subcarriers by alternate suppression of colour subcarrier reference
- Permanent waveform display of video line
- Automatic computation and display of all colour subcarrier amplitudes and phases when a standard colour bar signal is applied
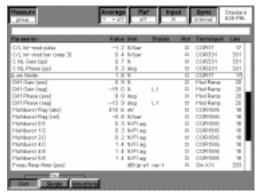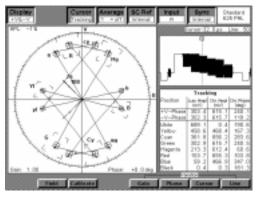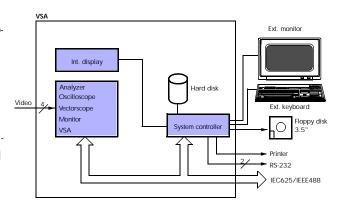
Monitor

- Easy identification of selected video signal
- Display of a video signal as monochrome TV picture with eight grey levels
- Simultaneous display of any rollkey-selected video line of the TV picture

System controller

- Comprehensive automatic test system
- Control of external devices via IEC/IEEE bus or serial interface
- Complete PC (DOS + Windows) with integrated IEC/IEEE-bus card
- Computing and measurement functions independent of each other
- Simple switchover between measurement display and DOS display
- VGA colour monitor and external keyboard available as accessories

Specifications in brief

Frequency range
Frequency range — 0 to 9 MHz
Standard — B/G, I, D, K PAL

Signal inputs
Video inputs — 75-Ω loopthrough filters
  Level — 1 V ±6 dB
  Return loss up to 6 MHz — >40 dB
  Return loss up to 10 MHz — >36 dB
  Decoupling of inputs
  up to 10 MHz — >85 dB
DC input — 1 MΩ
  Level — ±5 V

Signal outputs
Zero-reference control pulse, 75 Ω
  Level — 2.5 V ±10%
  Line position and duration — adjustable

Interfaces
Remote control — IEC 625-2/IEEE 448-2, 2x RS-232-C (9-pin)
Printer — parallel interface (Centronics)
External monitor — VGA colour monitor, 640 x 480 pixels
External keyboard — PC AT keyboard
Display — colour or monochrome, max. pixel error 0.017‰

Measurement parameters

Amplitude & delay	Unit	Range	Res.	Max. error
Luminance bar amplitude (abs)	mV	0 to 1400	0.1	±2.0
Luminance bar amplitude (nom)	%	−100 to +100	0.1	±0.3
Sync amplitude (abs)	mV	60 to 600	0.1	±2.0
Sync amplitude (nom)	%	−80 to +100	0.1	±0.5
Sync amplitude (bar)	%	−50 to +50	0.1	±0.5
Burst amplitude (abs)	mV	60 to 600	0.1	±3.0
Burst amplitude (nom)	%	−80 to +100	0.1	±1.0
Burst amplitude (bar)	%	−50 to +50	0.1	±1.0
C/L gain (modulated pulse)	%	−50 to +50	0.1	±1.0
C/L delay (modulated pulse)	ns	−500 to +500	1	±5
C/L gain (modulated bar)	%	−50 to +50	0.1	±1.0
Average picture level (bar)	%	0 to 200	0.1	±3.0
DC level X$_1$	mV	−2000 to +2000	0.1	±3.0
Residual picture carrier	%	0 to +30	0.1	±0.3
Residual picture black level	%	50 to 90	0.1	±0.3

Linear distortion

	Unit	Range	Res.	Max. error
Baseline distortion (bar)	%	−40 to +40	0.1	±0.3
2T pulse amplitude (bar)	%	−50 to +50	0.1	±0.5
2T k factor	%	0 to 10	0.1	±0.5
2T half-amplitude duration	ns	100 to 400	1.0	±3
Tilt	%	−40 to +40	0.1	±0.3
Short/field-time distortion	%	−40 to +40	0.1	±0.3

Non-linear distortion

	Unit	Range	Res.	Max. error
C/L intermodulation (modulated pulse)	%	−50 to +50	0.1	±1.0
C/L intermod. (modulated bar), 1/2/3 steps	%	−50 to +50	0.1	±0.3
C NL gain, pos/neg	%	0 to +50/−50	0.1	±0.7
C NL gain, pp	%	0 to 100	0.1	±1.0
C NL phase, pos/neg	deg	0 to +50/−50	0.1	±0.7
C NL phase, pp	deg	0 to 100	0.1	±1.0
Lum NL	%	0 to 50	0.1	±0.5
Lum NL, 1/2/3/4/5 steps	%	50 to 100	0.1	±0.5
Diff. gain, ref (bar)	%	−50 to +50	0.1	±0.3
Diff. gain, pos/neg	%	0 to +50/−50	0.1	±0.3
Diff. gain, pp	%	0 to 100	0.1	±0.5
Diff. gain, 1/2/3/4/5 steps	%	−50 to +50	0.1	±0.3
Diff. phase, pos/neg	deg	0 to +50/−50	0.1	±0.3
Diff. phase, pp	deg	0 to 100	0.1	±0.5
Diff. phase, 1/2/3/4/5 steps	deg	−50 to +50	0.1	±0.3

Frequency response	Unit	Range	Res.	Max. error
Multiburst flag (abs)	mV	0 to 1000	0.1	±2.0
Multiburst flag (nom)	%	−100 to +50	0.1	±0.3
Multiburst flag (bar)	%	−100 to +50	0.1	±0.3
Multiburst 0.5/1/2/4/4.8/5.8	%	−100 to +50	0.1	±1.0
Multiburst 0.5/1/2/4/4.8/5.8	dB	−40 to +6	0.01	±0.1
Multiburst (national) flag (abs)	mV	0 to 1000	0.1	±2.0
Multiburst (nat) flag (nom/bar)	%	−100 to +50	0.1	±0.3
Multiburst (nat) flag 0.5/1.5/3.0/4.4	%	−100 to +50	0.1	±1.0
Multiburst (nat) flag 0.5/1.5/3.0/4.4	dB	−40 to +6	0.01	±0.1
Sin x/x amplitude, pos/neg	dB	−100 to +100	0.01	±0.3
Sin x/x group delay, pos/neg	ns	−1000 to +1000	1.0	±20
Spectrum, pos/neg	dB	−100 to +100	0.01	±0.3

Noise measurements

	Unit	Range	Res.	Max. error
Lum noise, unw (abs)	mV	0 to 50	0.1	±1.0
Lum noise, unw (nom/bar)	dB	25 to 75	0.1	±1.0
Lum noise, lumw (abs)	mV	0 to 50	0.1	±1.0
Lum noise, lumw (nom/bar)	dB	25 to 80	0.1	±1.0
Lum noise, chrw (abs)	mV	0 to 50	0.1	±1.0
Lum noise, chrw (nom/bar)	dB	25 to 80	0.1	±1.0
Hum (abs.)	mV	0 to 700	1	±5
Hum (nom/bar)	dB	0 to 55	0.1	±1.0
C/SND intermodulation (abs)	mV	0 to 50	0.1	±1.0
C/SND intermod. (nom/bar)	dB	30 to 70	0.1	±1.0
SND/SND intermod. (abs)	mV	0 to 50	0.1	±1.0
SND/SND intermod. (nom/bar)	dB	30 to 70	0.1	±1.0
Chroma noise AM	dB	0 to −80	0.1	±1.0
Chroma noise PM	dB	−25 to −70	0.1	±1.0

Timing measurements

	Unit	Range	Res.	Max. error
Field period, first/sec. field	µs	20 000 ±30	0.001	±0.005
Equalizing pulse duration	µs	1.35 to 3.35	0.001	±0.005
Serration pulse duration	µs	2.70 to 6.70	0.001	±0.005
Line period	µs	60 to 68	0.001	±0.005
Line blanking (nom/bar)	µs	7 to 65	0.001	±0.05
Sync duration	µs	2.7 to 6.7	0.001	±0.005
Sync slope, neg/pos	µs	70 to 1000	1	±5
Burst position	µs	4.7 to 6.0	0.001	±0.01
Burst duration	µs	1.5 to 3.0	0.001	±0.01
SC/H, line/average	deg	−90 to +90	1	±4
SC/H, pos p/neg p/pp	deg	−90 to +90	1	±4
PAL phase, line/average	deg	0 to 180	1	±4
PAL phase, pos p/neg p/pp	deg	0 to 180	1	±4
SC frequency	Hz	4433 618 ±1000.05		±1

Jitter measurements

	Unit	Range	Res.	Max. error
Field jitter, pos p/neg p/pp	µs	0 to 30	0.001	±0.005
Field jitter, std. deviation	µs	0 to 30	0.001	±0.005
Line jitter, pos p/neg p/pp	ns	0 to 4000	1	±5
Line jitter, std. deviation	ns	0 to 4000	1	±5

Teletext measurements

	Unit	Range	Res.	Max. error
Basic amplitude (abs)	mV	0 to 1400	1	±10
Basic amplitude (nom/bar)	%	−100 to +100	0.1	±2.0
Decoding/timing margin	%	0 to 100	0.1	±2.0
Run-in bits	−	6 to 24	−	−
Data timing	µs	10 to 14	0.001	±0.01

General data

Rated temperature range — 0 to +50°C
Power supply — 100/230 V −10/+15%
120/240 V −15/+10%,
47 to 63 Hz (310 VA)
Dimensions (W x H x D); weight — 435 mm x 192 mm x 460 mm; 17.7 kg

Ordering information

Video Measurement System
  with monochrome display — VSA — 2013.6057.02
  with colour display — VSA — 2013.6057.03

Option
Calibration Data Documentation — VSA-DCV — 2082.0490.08