



Microprocessor Aided Controls

Automatic Modes

Portable Form Factor
(Compact Size/Light Weight)

Usable Frequency Range
From 50 kHz to 220 GHz

The 492 is a high performance, rugged, state of the art instrument of compact size, with microprocessor logic control. Full programmability via GPIB (IEEE 488-1978) compatibility is available for the 492P version.

Three-knob operation provides use as simple as 1, 2, 3 through microprocessor coupled functions such as resolution bandwidth, video bandwidth, sweep time, frequency span, rf attenuation, and reference level. Measurement accuracy is enhanced through the use of Δ dB mode, which switches in $\frac{1}{4}$ dB steps.

Digital storage and processing facilitate trace comparisons and add measurement

Amplitude Comparison in 0.25 dB Steps

Crt Readout of all Important Parameters

Fully Calibrated in Amplitude and Frequency

80 dB Dynamic Range

Wide Range of Options

capability through the max hold function for frequency drift and amplitude change measurements. Arithmetic operations can be performed between traces or between a trace and a reference. Digital noise averaging mode results in trace smoothing. With digital storage, the display is steady and without flicker, even at the lowest sweep speeds; plus, trace values may be retained as long as power is on.

GPIB Programmable

Three-knob Operation

Environmentalized per MIL-T-28800B

Digital Storage and Signal Processing

Freedom from Spurious Responses Through Preselection

SPECIFICATIONS

FREQUENCY RELATED

Frequency Range — 50 kHz to 21 GHz with internal mixer, to 220 GHz with external mixers. Option 08 deletes coverage above 21 GHz (calibrated mixers to 60 GHz available from Tektronix).

Frequency Accuracy — $\pm 0.2\%$ or 5 MHz whichever is greater +20% of span/div.

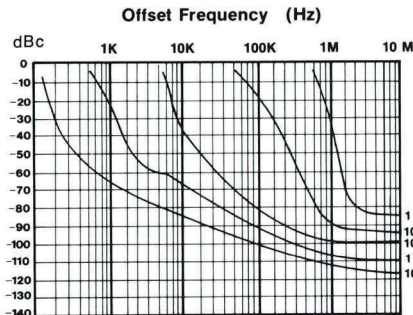
Frequency Readout Resolution — Within 1 MHz.

Frequency Span per Division — 10 kHz to 200 MHz plus zero and full band max span, down to 500 Hz with Opt. 03—in 1-2-5 sequence.

Frequency Span Accuracy — $\pm 5\%$ of span/div, measured over center eight divisions.

Resolution Bandwidth @ 6 dB Points — 1 MHz to 1 kHz (100 Hz for Option 03) in decade steps within $\pm 20\%$, manually or automatically selected.

Resolution Shape Factor (60/6 dB) — 7.5; maximum.



Typical Filter Shape, phase noise sidebands and sensitivity factors for fundamental mixing on a preselected 492 (Option 1).

SPURIOUS RESPONSES

Residual (no input signal) — 100 dBm or less referred to input mixer for fundamental conversion.

Harmonics — At least -60 dBc for full screen signal in the Min Distortion mode to 21 GHz. At least -100 dBc for preselected Option 01. 1.7 to 21 GHz.

Intermodulation — 3rd order products at least -70 dB down from two full screen signals within any frequency span in the Min Distortion mode. At least -100 dB down for two signals spaced more than 100 MHz apart from 1.7 to 21 GHz for preselected Option 01.

L.O. Emissions (referenced to input mixer) — 10 dBm maximum; -70 dBm maximum for Option 01.

STABILITY (after 2 hour warm-up)

Residual FM — (1 kHz p-p) n (mixing number) for 2 ms time duration, improves to (50 Hz) n for 20 ms with phase-lock Option 03.

Long Term Drift: 200 kHz/hour unphasedlocked, 25 kHz/hour phasedlocked for fundamental mixing.

Noise Sidebands — At least 75 dBc @ 30X resolution offset (70 dBc for 100 Hz resolution) for fundamental mixing.

AMPLITUDE RELATED

Reference Level Range — -123 dBm to +40 dBm (+30 dBm maximum safe input) for 10 dB/div and 2 dB/div log modes. 20 nV/div to 2 V/div (1 W maximum safe input) in the linear mode.

Reference Level Steps — 10 dB, 1 dB, and 0.25 dB for relative level (Δ) measurements in log mode. 1-2-5 sequence and 1 dB equivalent increments in LIN mode.

Reference Level Accuracy — Amplitude change of 0.25 dB \pm 0.05 dB, 1 dB \pm 0.2 dB, 10 dB \pm 0.5 dB; to a maximum of \pm 1.4 dB for 60 dB and \pm 2 dB for 90 dB reference level change when gain change and attenuation do not offset each other.

Display Dynamic Range — 80 dB @ 10 dB/div, 16 dB @ 2 dB/div and 8 divisions linear.

Display Amplitude Accuracy — \pm 1 dB/10 dB to maximum of \pm 2 dB/80 dB; \pm 0.4 dB/2 dB to maximum of \pm 1 dB/16 dB; \pm 5% of full screen in LIN mode.

Resolution Bandwidth Gain Variation — \pm 0.5 dB.

SENSITIVITY AND FREQUENCY RESPONSE

Frequency Range	Mixing Number (n)	Average Noise Level for 1 kHz Resolution		Frequency Response With 10 dB Attenuation	
		No Preselection	Preselected Option 01	No Preselection	Preselected Option 01
50 kHz-1.8 GHz*	1	-115 dBm	-110 dBm		\pm 1.5 dB
50 kHz-4.2 GHz	1	-115 dBm	-110 dBm	\pm 2.5 dB	
100 kHz-4.2 GHz	1	-115 dBm	-110 dBm	\pm 1.5 dB	
1.7-5.5 GHz	1	-115 dBm	-110 dBm	\pm 1.5 dB	\pm 2.5 dB
3.0-7.1 GHz	1	-115 dBm	-110 dBm	\pm 1.5 dB	\pm 2.5 dB
5.4-18 GHz	3	-100 dBm	-95 dBm (12 GHz) -90 dBm (18 GHz)	\pm 2.5 dB	\pm 3.5 dB
15-21 GHz	3	-95 dBm	-85 dBm	\pm 3.5 dB	\pm 5.0 dB
100 MHz-18 GHz**				\pm 3.5 dB	\pm 4.5 dB
With Tektronix optional high performance waveguide mixers					
18-26 GHz	6	-80 dBm		\pm 3 dB	
26-40 GHz	10	-80 dBm		\pm 3 dB	
40-60 GHz	10	-80 dBm		\pm 3 dB	

*Low frequency end performance does not include due to zero Hz feedthrough.

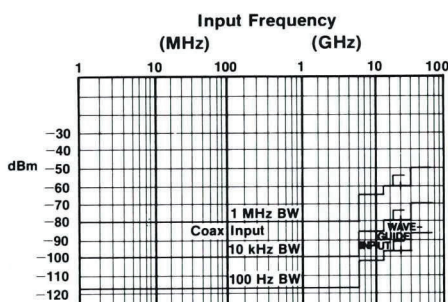
**Includes frequency band switching error of 1 dB maximum.

INPUT CHARACTERISTICS

Internal Mixer — Type N female connector, VSWR 1.45 to 18 GHz, and 3.5 to 21 GHz; with 10 dB or more attenuation.

Optimum Level for Linear Operation — 30 dBm referenced to mixer.

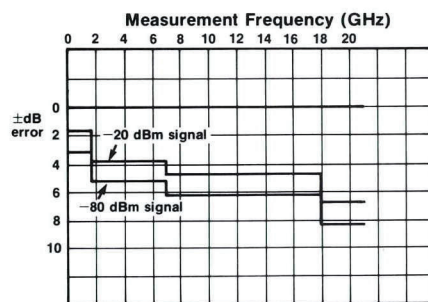
1 dB Compression Point — -28 dBm from 1.7 to 2 GHz for Option 01; otherwise -10 dBm.



Sensitivity Showing Averaged Noise Level for Preselected 492 (Option 1)

Maximum Safe Input Level — +13 dBm without Option 01, +30 dBm (1 watt) with Option 01, zero rf attenuation.

Attenuator Power Limit — +30 dBm (1 w) continuous, 75 W peak for 1 μ s or less pulse width and 0.001 maximum duty factor.



Cumulative maximum absolute amplitude measurement error as a function of amplitude and frequency for a preselected 492 (Option 01).

OUTPUT CHARACTERISTICS

Calibrator — -20 dBm \pm 0.3 dB, 100 MHz \pm 0.001%.

1st LO — +7.5 dBm @ 50 Ω nominal.

2nd LO — -16 dBm @ 50 Ω nominal.

Vertical Out — 0.5 V \pm 5%/division, 1 k Ω nominal.

Horizontal Out — 0.5 V \pm 10%/division, 1 k Ω nominal.

Pen Lift — TTL, 5 V nominal.

IF Out — -15 dBm nominal for full screen, -30 dBm display; 10 MHz, 50 Ω .

GPB Control — IEEE 488 input/output control for 492 P.

MISCELLANEOUS

Sweep Time — 20 μ s to 5 s/div (10 s/div in auto) in 1-2-5 sequence.

Crt Readout — Reference level, center frequency, frequency range, vertical display mode, frequency span/div, resolution bandwidth, and rf attenuation.

Crt — 8x10 cm, P31 Phosphor.

Power — 90 to 132 VAC, 180 to 250 VAC, 48 to 440 Hz, 210w max with all options.

Environmental Characteristics — Per MIL-T-28800B type III, class 3, style C.

Configuration — Portable, 44 lb (all options), 6.9 x 12.9 x 19.7 inches without handle or cover.

ORDERING INFORMATION

492 Spectrum Analyzer\$17,850

492P Spectrum Analyzer\$20,850

Option 01—Internal PreselectionAdd \$3500
Provides calibrated preselected filtering of first mixer for each frequency band.

Option 02—Digital StorageAdd \$1500
Provides multiple memory display storage with Save A, Max Hold, B Minus Save A, display averaging, and storage bypass.

Option 03—Frequency Stabilization/100 Hz ResolutionAdd \$3000
Provides first local oscillator stabilization by phase locking the oscillator to an internal reference. Also provides 100 Hz resolution.

Option 08—Delete External Mixer Capability Sub \$850
Deletes external mixer capability which provides internal switching and connection capability to connect and use external waveguide mixers.

Option 20—General Purpose 12.4 to 40 GHz Waveguide Mixer SetAdd \$520
Includes three mixers (12.4 to 18 GHz, 18 to 26.5 GHz, and 26.5 to 40 GHz) and attaching hardware to extend the upper frequency.

Option 21—High Performance 18 to 40 GHz Waveguide Mixer SetAdd \$1715
Includes two mixers (18 to 26.5 GHz and 26.5 to 40 GHz) and attaching hardware to extend the upper frequency.

Option 22—High Performance 18 to 60 GHz Waveguide Mixer Set\$2665
Includes three mixers (18 to 26.5 GHz, 26.5 to 40 GHz, and 40 to 60 GHz) and attaching hardware to extend the upper frequency.

OPTIONAL ACCESSORIES

The following listed accessories are optional to all models and configurations of the 492 system, and may be ordered in any combination.

General Purpose 12.5 to 40 GHz Waveguide Mixer Set (016-0640-00)\$550

High Performance 18 to 40 GHz Waveguide Mixer Set (016-0662-00)\$1755

High Performance 18 to 60 GHz Waveguide Mixer Set (016-0657-00)\$2705

Hard Case (transit) (016-0658-00)\$495

Soft Case (016-0659-00)\$125

C-5C Camera\$295

Note: The 492 Spectrum Analyzer system is compatible with all TEKTRONIX C-50 Series Cameras.