

Performance for the Lab that goes into the Field

The Tektronix 492 and 496 are two spectrum analyzers that go where you go. Their compact size, light weight, and rugged design combine to offer unmatched portability in laboratory quality analyzers.

Single-handle carry and portable form factor make them ready to travel. The 492 and 496 move as easily in the field as in the design lab or systems test area. They even fit under an airplane seat.

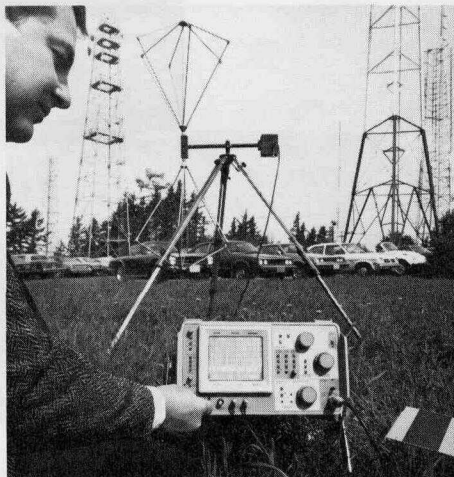
You can count on the same exceptional performance no matter where you're working. If its antenna test measurements, point-to-point transmission maintenance, or any number of critical field applications, the 492 and 496 work with you.

For on-site applications, reduced warmup time means reduced measurement time. Typical long-term frequency drift of 5 kHz/10 minutes after 30 minute warm up for the 492 and 492P; 2 kHz/10 minutes after 30 minute warm up for the 496 and 496P.

Here's Proof of Their Performance

The Tektronix 492 has the widest amplitude calibrated frequency range of any spectrum analyzer on the market: 50 kHz to 220 GHz —to 21 GHz in coax, from 18 GHz to 220 GHz using Tektronix external waveguide mixers. The VHF/UHF 496 covers from 1 kHz to 1.8 GHz.

They offer 80 dB dynamic range on-screen and excellent sensitivity, with an average noise level of -123 dBm at 100 Hz resolution bandwidth for the 492, -127 dBm at 30 Hz resolution bandwidth for the 496. Low phase noise -70 dBc at only 3 kHz offset —for accurate small-signal analysis. High stability for signal source spectral purity analysis, with residual FM of no more than 50 Hz peak-to-peak for the 492, 10 Hz peak-to-peak for the 496. For precise measurement of signal differences, there's amplitude comparison in super-fine 0.25 dB



steps. And the 496 provides 1 kHz frequency resolution in AF mode. All this and more in one compact package that goes where you go.

Programmability/IEEE (GPIB) Compatibility

The GPIB interface enables full control of all measurement settings. Additional control of horizontal (span) and vertical display (1 dB to 15 dB/div) and smart functions (such as signal search) provide added measurement versatility. A desktop computer or computer controller (4052A or 4041) and a 492P or 496P Spectrum Analyzer provide repetitive measurements, data collection, and consistent, rapid results. Automated testing and monitoring may include data correction and analysis enabling complex measurements such as total harmonic distortion and power spectral density. The thermal printer of the 4041 or hard copiers for 4052A simplify documenting tests and spectral displays in hard copy form.

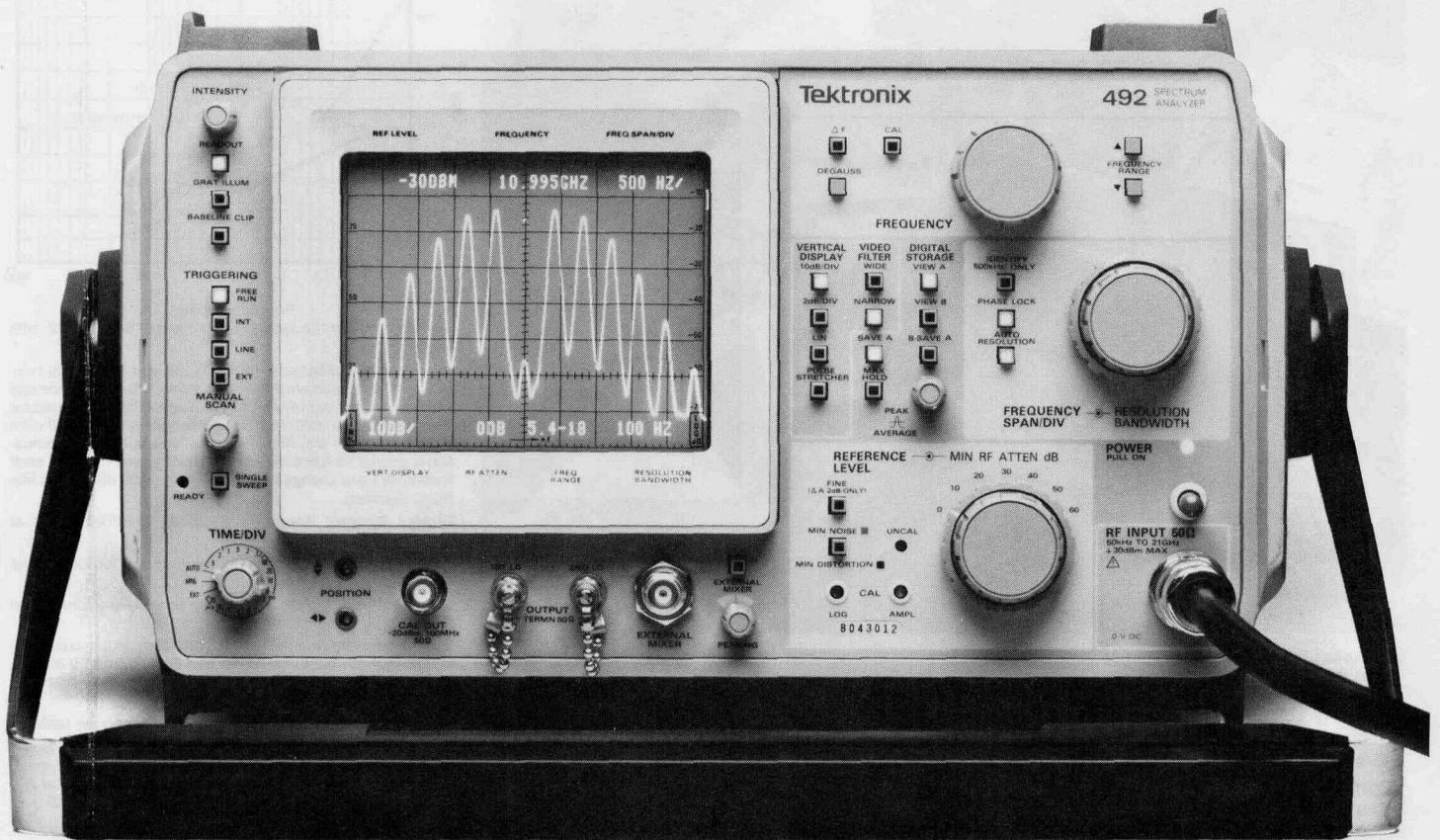
Programmability Now—or Later

Most manual 490 Series spectrum analyzers can be converted into fully programmable, GPIB compatible analyzers. Conversion may be performed via the Tektronix Service Center near you.

Easy to Use—Anywhere

Tektronix designed the 492 and 496 to handle your measurement task with microprocessor-aided ease. Setting frequency, span and reference level is a simple three-knob operation. Most-used functions are automatically controlled. Digital storage and signal processing eliminate time-consuming display adjustments. And constant tuning rate helps you position a signal quickly and accurately. All part of the convenience and capability the 492 and 496 deliver, on site or on the bench.

Tektronix offers service training classes on the 490 Portable Spectrum Analyzers. For further training information, contact your local Sales/Service Office or request a copy of the Tektronix Service Training Schedule on the return card in the center of this catalog.



**GPIB
 IEEE-488**

492P

492

The 492P complies with IEEE Standard 488-1978, and with Tektronix *Standard Codes and Formats*.

Microprocessor Aided Controls

Automatic Modes

**Portable Form Factor
(Compact Size/Lightweight)**

50 kHz to 220 GHz Frequency Range

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

GPIB/Fully Programmable (492P)

Three-Knob Operation

Environmentalized per MIL-T-28800C

Digital Storage and Signal Processing

**Freedom from Spurious Responses
Through Preselection**

Lab Quality You Can Get a Handle On

The 492 is a high performance, rugged, state-of-the-art instrument of compact size, with microprocessor logic control. Full programmability via GPIB (IEEE Standard 488-1978) compatibility is available in 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 A dB mode, which switches in 0.25 dB steps.

Digital storage and processing facilitate trace comparisons and add measurement 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.

492P Makes Spectrum Analysis Automatic, and Easy.

Two instruments in one, the 492P is a fully programmable version of the 492 Spectrum Analyzer. It incorporates all of the 492's lab quality performance and ease of use features when used as a manual instrument. Push the "Reset to

Local" button and the 492P becomes a 492—with operation from the front panel. But, most important, the 492P opens the way to automated spectrum analysis and documentation via its IEEE Standard-488 (GPIB) interface. This versatility makes the 492P useful in many applications in the lab, factory or field.

Programmability/GPIB features can be added to 492 Spectrum Analyzers, serial number B030000 and above. This means if you want to postpone a programmability/GPIB decision because of budget constraints, or for any other reason, you can convert your 490 Series spectrum analyzer later. Conversions are made at designated Tektronix Service Centers.



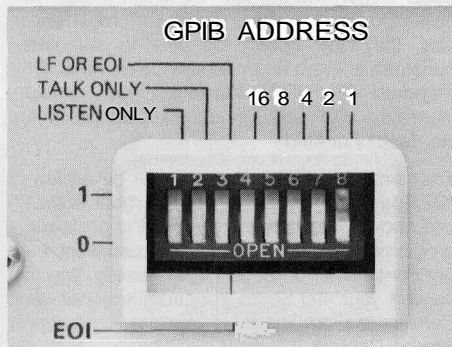
SPECTRUM ANALYZERS



When used with the Tektronix 4052A Graphic Computing System Controller and 4631 Hard Copy Unit, or with the 4662 Digital Plotter, the 492P can provide test results in both graphic and numeric form for the evaluation of microwave signal sources.

Remotely Controllable via GPIB

Switches on the rear panel select the mode of operation as a GPIB instrument. In the normal Talker/Listener mode, the 492P listens to and executes commands from a GPIB controller. All important front panel settings can be operated remotely. Some functions are controlled with more detail through the GPIB than possible from the front panel.



Easy to Use

The 492P is designed for ease of operation via the GPIB, just as the 492 is designed for front panel operational ease. Most commands for program control are simply abbreviations of the front panel nomenclature.

The 492P's high level command language and the similarity of commands and responses simplify programming and make program listings easily readable for editing.

Put it to Work

With the programmable 492P on your measurement team, repetitive measurements can be done the same way every time. Your throughput will increase—and your confidence in results. And, the internal processing and high level programming language makes software development faster. You get high power results

with easy programming. When you look at the total performance capability of the 492P, you'll recognize its value: ease of operation both as a programmable and manual instrument. Wide frequency range. The versatility to go where you go. Into the lab for automated testing; into the field for data collection.

The Tektronix 4932 GPIB Extender provides a cost-effective way to interconnect remotely located GPIB instruments, allowing communication at distances of up to 500 meters (1650 feet). See page 132 for additional information.

For more information on the application and benefits of the 490 Series Spectrum Analyzers under program control, ask for brochure 26W-5177.

CHARACTERISTICS

The following characteristics and features apply to the 492/492P Spectrum Analyzers after a 30 minute warmup period unless otherwise noted.

FREQUENCY RELATED

Center Frequency Range — 50 kHz to 21 GHz standard, amplitude specified coverage to 220 GHz with optional Tektronix waveguide mixers.

Frequency Accuracy — $\pm(5 \text{ MHz} + 20\% \text{ of span/div})$ or $\pm(0.2\% \text{ of the center frequency} + 20\% \text{ of span/div})$ whichever is greater after 2 hour warmup.

Readout Resolution — Within 1 MHz.

Frequency Span/Div Range — 10 kHz to 500 MHz/Div in a 1-2-5 sequence in the 50 kHz to 21 GHz Center Frequency Range. Option 03 provides additional span ranges of 500 Hz, 1 kHz, 2 kHz, and 5 kHz/Div.

Span Accuracy — $\pm 5\%$ of span/div, measured over center 8 divisions.

Resolution Bandwidth (-6 dB Points) — 1 MHz to 1 kHz (100 Hz for Option 03) in decade steps, plus an Auto position. Resolution is within 20% of selected bandwidth.

Resolution Shape Factor (60/6 dB) — 7.5:1 or less.

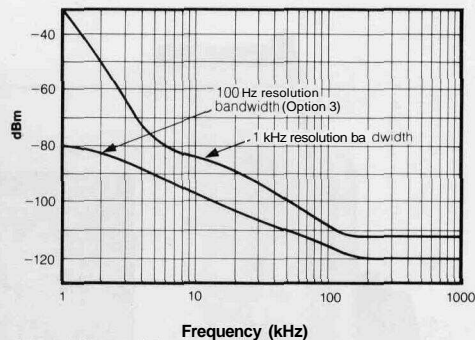
Residual FM — 1 kHz p-p for 2 ms time duration, improves to (50 Hz) for 20 ms with phaselock Option 03.

Long Term Drift (At Constant Temperature and Fixed Center Frequency) — 3 kHz/10 minutes after one hour warmup with Option 03 for fundamental mixing.

Noise Sidebands — At least -75 dBc at 30X Resolution offset from the center frequency (-70 dBc for 100 Hz resolution bandwidth Option 03).

AMPLITUDE RELATED

Reference Level Range — Full screen, top of graticule -123 dBm to $+40 \text{ dBm}$ ($+40 \text{ dBm}$, includes maximum safe input of $+30 \text{ dBm}$ and 10 dB gain of IF gain reduction) for 10 dB/div and 2 dB/div log modes. 1 W maximum safe input in the linear mode.



Typical low end frequency performance for the 492 with Option 01.

Reference Level Steps — 10 dB, 1 dB, and 0.25 dB for relative level (A) measurements in Log mode. 1-2-5 sequence and 1 dB equivalent increments in Lin mode. The RF attenuator steps 10 dB for reference level changes above -30 dBm (-20 dBm when Min Noise is active) unless Min RF attenuation is greater than normal. The IF gain increases 10 dB for each Reference Level change below -30 dBm (-20 dBm when Min Noise is active).

Display Dynamic Range — 80 dB at 10 dB/Oiv, 16 dB at 2 dB/Div and 8 div in linear mode.

Reference Level Accuracy — Accuracy is a function of the characteristics listed below.

Calibrator — (Cal out) See output signal characteristics on next page.

Input Attenuator Accuracy — 0.3 dB/10 dB to a maximum of 0.7 dB over the 60 dB range, up to 4 GHz; 0.5 dB/10 dB to a maximum of 1.4 dB over the 60 dB range from 4 GHz to 21 GHz.

Frequency Response — See frequency response table on next page.

Display Amplitude Accuracy — $\pm 1.0 \text{ dB}/10 \text{ dB}$ to a maximum cumulative error of $\pm 2.0 \text{ dB}$ over the 80 dB window and $\pm 0.4 \text{ dB}/2 \text{ dB}$ to a maximum cumulative error of $\pm 1.0 \text{ dB}$ over the 16 dB window. Lin Mode is 5% of full scale.

Resolution Bandwidth Gain Variation — $\pm 0.5 \text{ dB}$.

IF Gain Variation — $\pm 0.2 \text{ dB}/\text{dB}$ to a maximum of $\pm 2 \text{ dB}$ over the 90 dB range.

SPURIOUS RESPONSES

Residual (No Input Signal Referenced to Mixer Input) — -100 dBm or less.

Harmonic Distortion (cw Signal, Min Distortion Mode) — 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.

Third-Order Intermodulation Distortion (Min Distortion Mode) — At least 70 dB down from two full screen signals within any frequency span. At least 100 dB down for two signals spaced more than 100 MHz apart from 1.7 to 21 GHz for preselected Option 01.

LO Emissions (Referenced to Input Mixer) — -10 dBm maximum; -70 dBm maximum to 21 GHz for Option 01.

INPUT SIGNAL CHARACTERISTICS

RF Input — Type N female connector.

Input Impedance — 50 Ω .

Maximum VSWR*1 with $\geq 10 \text{ dB}$ Attenuation

Frequency Range	Typical	Specified Maximum
DC to 2.5 GHz	1.2:1	1.3:1
2.5 GHz to 6.0 GHz	1.5:1	1.7:1
6.0 GHz to 18 GHz	1.9:1	2.3:1
18 GHz to 21 GHz	2.7:1	3.5:1

*1 At Type N female connector to internal mixer, with 10 dB attenuation

Input Level (Optimum Level for Linear Operation) — -30 dBm referenced to input mixer. Full screen not exceeded and Min Distortion control settings.

1 dB Compression Point — -18 dBm except -28 dBm at 1.7 GHz to 2 GHz for Option 01 only.

Maximum Safe Input Level (RF Attenuation at Zero dB) — $+13 \text{ dBm}$ without Option 01. $+30 \text{ dBm}$ (1 W) with Option 01.

Maximum Input Level (with 20 dB or more RF Attenuation) — $+30 \text{ dBm}$ (1 W) continuous, 75 W peak for 1 μs or less pulse width and 0.001 maximum duty factor (attenuation limit). DC must never be applied to RF input.

SENSITIVITY AND FREQUENCY RESPONSE

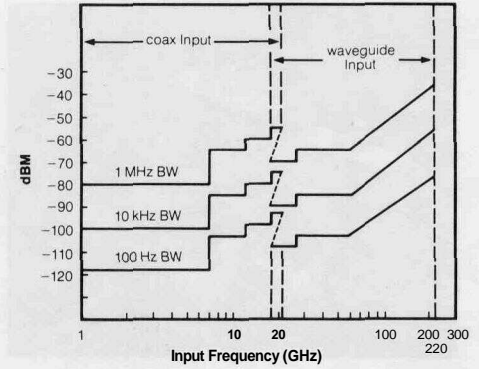
Frequency Range	Mixing Number (n)	Average Noise Level for 1 kHz Resolution		Frequency Response With 10 dB Attenuation	
		No Preselection	Preselected Option 01	No Preselection	Preselected Option 01
50 kHz to 1.8 GHz*	1	-115 dBm	-110 dBm	±1.5 dB	±1.5 dB
50 kHz to 4.2 GHz*	1	-115 dBm	-110 dBm	±1.5 dB	±1.5 dB
1.7 GHz to 5.5 GHz	1	-115 dBm	-110 dBm	±1.5 dB	±2.5 dB
3.0 GHz to 7.1 GHz	1	-115 dBm	-110 dBm	±1.5 dB	±2.5 dB
5.4 GHz to 18 GHz	3	-100 dBm	-95 dBm (12 GHz) -90 dBm (18 GHz)	±2.5 dB	±3.5 dB
15 GHz to 21 GHz	3	-95 dBm	-85 dBm	±3.5 dB	±5.0 dB
100 MHz to 18 GHz***				±3.5 dB	±4.5 dB
WITH TEKTRONIX OPTIONAL HIGH PERFORMANCE WAVEGUIDE MIXERS					
18 GHz to 26 GHz	6	-100 dBm		±3.0 dB	
26 GHz to 40 GHz	10	-95 dBm		±3.0 dB	
40 GHz to 60 GHz	10	-95 dBm		±3.0 dB	
60 GHz to 90 GHz	15	-95 dBm @ 60 GHz† -85 dBm @ 90 GHz†		±3.0 dB** ±3.0 dB**	
90 GHz to 140 GHz	23	-85 dBm @ 90 GHz† -75 dBm @ 140 GHz†		±3.0 dB** ±3.0 dB**	
140 GHz to 220 GHz	37	-65 dBm @ 220 GHz†		±3.0 dB**	

* Low frequency end performance does not include effects due to 0 Hz feedthrough.

** Over any 5 GHz bandwidth.

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

† Typical



OUTPUT SIGNAL CHARACTERISTICS

Calibrator (Cal Out) — -20 dBm ±0.3 dB, 100 MHz ±1.7 kHz.

1st and 2nd LO — Provides access to the output of the respective local oscillators (1st LO +7.5 dBm min to a max of +15 dBm; 2nd LO -22 dBm min to a max of +15 dBm). These ports must be terminated in 50 Ω at all times.

Vertical Out — Provides 0.5 V ±5% of signal/div of video above and below the center line.

Horizontal Out — Provides 0.5 V either side of center. Full range -2.5 V to +2.5 V ±10%.

Pen Lift — TTL, +5 V nominal to lift pen.

IF Out — Output of the 10 MHz IF. Level is approximately -16 dBm for a full screen signal at -30 dBm input reference level. Nominal impedance 50 Ω.

492P Only: IEEE Standard 488-1978 Port (GPIB) — In accordance with IEEE Standard 488.

GENERAL CHARACTERISTICS

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

CRT Readout — Displays reference level, center frequency, frequency range, vertical display mode, frequency span/div-resolution bandwidth and RF attenuation.

CRT — 8 x 10 cm, GH (P31) Phosphor.

Input Voltage — 90 V ac to 132 V ac or 180 V ac to 250 V ac, 48 Hz to 440 Hz.

Power — 210 W max with all options, at 115 V and 60 Hz.

ENVIRONMENTAL CHARACTERISTICS

Per MIL-T-28800C Type III, Class 3, Style C.

Temperature — Operating: -15°C to +55°C. Nonoperating: -62°C to +75°C.

Humidity — Operating: 95%. Nonoperating: 120 hours per MIL-STD 810.

Rain Resistance — Drip proof at 16 liters/hour/square foot.

Altitude — Operating: 4500 m (15,000 ft). Nonoperating: 12,000 m (40,000 ft).

Vibration — 15 Hz to 55 Hz at 0.025 inch excursion.

Shock — 30 g of half sine 11 ms duration.

Drop — 12 inches.

Electromagnetic Compatibility — 490 Series spectrum analyzers meet the requirements of MIL-STD-461B, operating from 48 Hz to 440 Hz power sources, with the exceptions shown below.

Conducted Emissions — CE01: 15 dB relaxation for first 10 harmonics of power line frequency. CE03 (Narrowband): Full limits. CE03 (Broadband): 15 dB relaxation from 15 kHz to 50 kHz.

Conducted Susceptibility — CS01: Full limits. CS02: Full limits. CS06: Full limits.

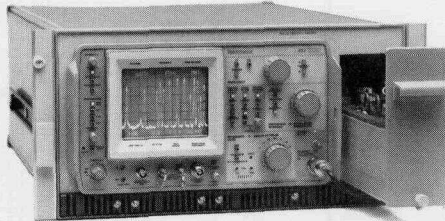
Radiated Emissions — RE01: 10 dB relaxation for first 10 harmonics of power line frequency, and excepted from 30 kHz to 36 kHz. RE02: Full limits.

Radiated Susceptibility — RS01: Full limits. RS02-1: Full limits. RS02-2: To 5 A only. RS03: Up to 1 GHz only.

Configuration — Portable. 492/492P Option 1,2,3 total weight including front cover and standard accessories. 20 kg (49 lb), 17.5 x 32.7 x 49.9 cm (6.9 x 12.9 x 19.7 in) without handle or cover.

INCLUDED ACCESSORIES

6 ft N to N connector 50 Ω coaxial cable, (012-0114-00); 18 in BNC to BNC connector 50 Ω coaxial cable (012-0076-00); N male to BNC female adaptor (103-0045-00); CRT mesh filter (378-0726-01); 2 A fast blow fuse (159-0021-00); two 4 A fast blow fuse (159-0017-00); 115 V power cord (161-0118-00); cord clamp (343-0170-00); CRT visor (016-0653-00); diplexer assembly (015-0385-00); amber CRT light filter (378-0115-01); blue CRT light filter (378-0115-02); 492P also includes 2 m, double shielded GPIB cable (012-0630-03); operators manual; operators handbook; service manual.



490 Series Spectrum Analyzers Rackmount/Benchmount Options

The following options denote mechanical configurations of the 492/492P/496/496P. Option 30 is a rackmount configuration for the 490 Series with standard front panel input/outputs. Option 31 is a rackmount configuration with rear panel input/output capability. Option 32 adds side covers and trim to an Option 31 making it into a stackable bench top configuration.

The Option 30 and 31 Rackmount is a standard 19 inch rack width and comes with standard rackmount fittings. A spectrum analyzer accessories storage drawer is also included. Dimensions are 22.23 x 42.9 x 63.5 cm (8.75 x 16.89 x 25.0 in). Weight is 24.5 kg (59 lb); including the spectrum analyzer.

The Option 32 Benchmount is approximately the same size as the Rackmount but is dressed with side and top panels and carrying handles and feet. The Benchmount provides a convenient surface for stacking other instruments. Dimensions are 23.5 x 45.7 x 63.5 cm (9.25 x 17.9 x 25.0 in). Weight is 28.1 kg (62 lb); including the spectrum analyzer.

ORDERING INFORMATION

492 Spectrum Analyzer \$21,500

492P Fully Programmable/GPIB

Spectrum Analyzer \$28,600

492 to 492P Conversion — Conversion made by your Tektronix Service Center. For 492's with Options 01, 02, 03, 08.

Order 040-1038-02 \$6,800

For 492's with Options 01, 02, 03. Order 040-1037-02 .. \$6,800

Option 01 — Internal Preselection +\$3,900

Provides calibrated preselected filtering of input to first mixer for each frequency band.

Option 02 — Digital Storage +\$1,900

Provides multiple memory display storage with Save A, Maximum Hold, B Minus Save A, display averaging, and storage bypass.

Option 03 — Frequency Stabilization/

100 Hz Resolution +\$3,500

Provides first local oscillator stabilization by phase locking the oscillator to an internal reference.

Option 08 — Delete External Mixer Capability -\$1,750

Deletes internal switching front panel connector and external diplexer to connect and use external waveguide mixers.

Option 20 — General Purpose 12.4 GHz to 40 GHz Waveguide

Mixer Set +\$865

Includes three mixers (12.4 GHz to 18 GHz, 18 GHz to 26.5 GHz, and 26.5 GHz to 40 GHz) and attaching hardware to extend the upper frequency.

Option 21 — High Performance 18 GHz to 40 GHz Waveguide

Mixer Set +\$2,475

Includes two mixers (18 GHz to 26.5 GHz and 26.5 GHz to 40 GHz) and attaching hardware to extend the upper frequency.

Option 22 — High Performance 18 GHz to 60 GHz Waveguide

Mixer Set +\$4,155

Includes three mixers (18 GHz to 26.5 GHz, 26.5 GHz to 40 GHz, and 40 GHz to 60 GHz) and attaching hardware to extend the upper frequency.

Option 30 — Rackmount. 19 inch rack width with front panel

input/outputs +\$790

Option 31 — Rackmount. 19 inch rack width with rear panel

input/output capability +\$840

Option 32 — Benchmount. Adds side and top panels,

carrying handles and feet for a stackable bench top

configuration +\$940

INTERNATIONAL POWER CORD AND PLUG OPTIONS

Option A1 — Universal Euro 220 V/16 A, 50 Hz

Option A2 — UK 240 V/13 A, 50 Hz

Option A3 — Australian 240 V/10 A, 50 Hz

Option A4 — North American 240 V/15 A, 60 Hz

Option A5 — Switzerland 220 V/10 A, 50 Hz

PERIPHERAL PRODUCTS FOR

492P SPECTRUM ANALYZER

4041 System Controller \$4,995

4052A Graphic Computing System Controller \$9,900

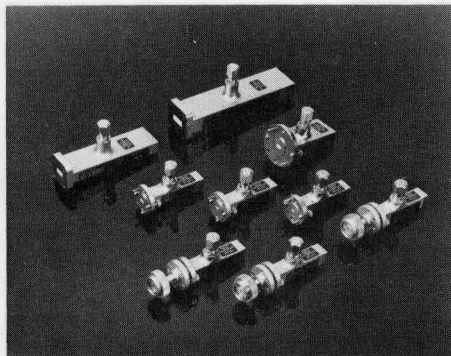
4611 Hard Copy Unit \$4,550

4631 Hard Copy Unit \$5,950

4662 Interactive Digital Plotter \$2,995

4924 Digital Cartridge Tape Drive \$2,990

4932 GPIB Extender \$1,195



490 Series Waveguide Mixers

The 490 Series Tektronix Waveguide Mixers cover from 18 GHz to 220 GHz with optimum sensitivity. They are designed specifically for use with the Tektronix 492/492P and 7L18 Spectrum Analyzers.

The two microwave mixers cover ranges 18 GHz to 26.5 GHz and 26.5 GHz to 40 GHz. They have field replaceable diodes and frequency response of ± 3 dB when used with the spectrum analyzers indicated above.

Seven millimeter wave mixers cover the 40 GHz to 220 GHz range in the standard Mil-spec band ranges. A mixer designed specifically for the 140 GHz to 220 GHz band is available, or a flange transition (119-1729-00) can be used to allow the 90 GHz to 140 GHz mixer to cover this range.

The mixers are all gold plated brass, conforming to MIL-G-45204 Class I, Type 1 specifications and will withstand harsh environments. Each set comes complete with a container for spare diodes, a 28-inch cable, an instruction manual and a wood storage box with foam cutout storage locations for five mixers.

CHARACTERISTICS

For All Waveguide Mixers — Maximum cw RF input level: +10 dBm (10 mW).

Maximum PULSED RF Input Level — 1 W peak with 0.001 maximum duty factor and 1 μ s maximum pulse width.

L.O. Requirement — +7 dBm minimum, +15 dBm maximum, +10 dBm typical.

Bias Requirement — -2.0 V to +0.5 V with respect to the mixer body through a current limiting resistor, to provide 0 mA to 20 mA of bias current.

For the 18 GHz to 60 GHz Waveguide Mixers — 3 dB compression point (saturation): -10 dBm (typical).

Conversion Loss — 30 dB typical (when used in the proper spectrum analyzer frequency band).

ORDERING INFORMATION

Performance Specified Mixers and Sets:

18 GHz to 26.5 GHz Frequency Range —	
Order WM 490K	\$1,225
26.5 GHz to 40 GHz Frequency Range —	
Order WM 490A	\$1,225
40 GHz to 60 GHz Frequency Range —	
Order WM 490U	\$1,680
50 GHz to 75 GHz Frequency Range —	
Order WM 490V	\$1,950
60 GHz to 90 GHz Frequency Range —	
Order WM 490E	\$2,075
75 GHz to 110 GHz Frequency Range —	
Order WM 490W	\$2,075
90 GHz to 140 GHz Frequency Range —	
Order WM 490F	\$2,275
110 GHz to 170 GHz Frequency Range —	
Order WM 490D	\$3,175

ELECTRICAL CHARACTERISTICS

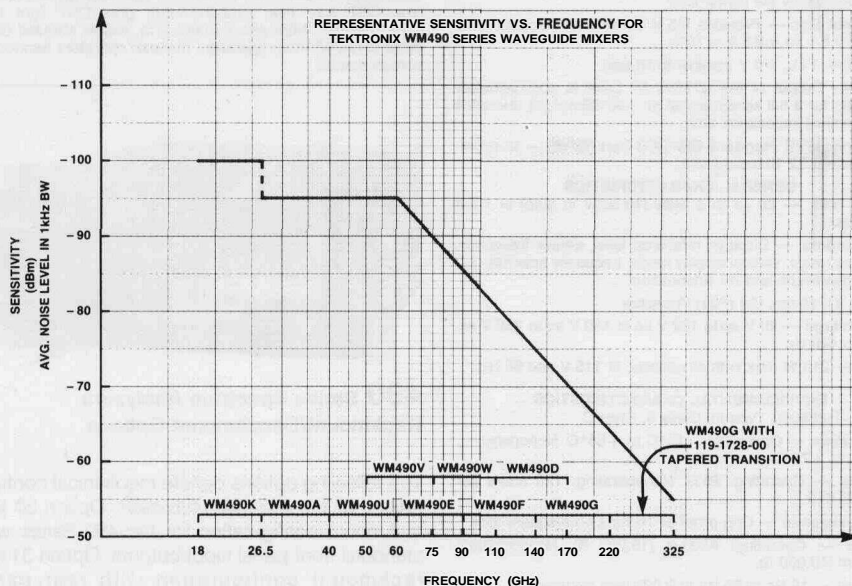
Frequency Range (GHz)	Tektronix Model No	Band Designation	Sensitivity (dBm)*1	Frequency Response*2	Amplitude Accuracy*3	3 dB Compression Point (Saturation)
18 to 26.5	WM 490K	K	-100	± 3 dB	± 6 dB	-10 dBm typical
26.5 to 40	WM 490A	A	-95	± 3 dB	± 6 dB	-10 dBm typical
40 to 60	WM 490U	U	-95	± 3 dB	± 6 dB	-10 dBm typical
50 to 75	WM 490V	V	-95 at 50 GHz	± 3 dB		-10 dBm at 50 GHz
			-90 at 75 GHz	typical*4		-10 dBm at 75 GHz
			typical			typical
60 to 90	WM 490E	E	-95 at 60 GHz	± 3 dB		-10 dBm at 60 GHz
			-85 at 90 GHz	typical*4		-5 dBm at 90 GHz
			typical			typical
75 to 110	WM 490W	W	-90 at 75 GHz	± 3 dB		-10 dBm at 75 GHz
			-80 at 110 GHz	typical*4		0 dBm at 110 GHz
			typical			typical
90 to 140	WM 490F	F	-85 at 90 GHz	± 3 dB		-5 dBm at 90 GHz
			-75 at 140 GHz	typical*4		0 dBm at 140 GHz
			typical			typical
110 to 170	WM 490D	D	-80 at 110 GHz	± 3 dB		0 dBm at 110 GHz
			-70 at 170 GHz	typical*4		+5 dBm at 170 GHz
			typical			typical
140 to 220	WM 490G	G	-75 at 140 GHz	± 3 dB		0 dBm at 140 GHz
			-65 at 220 GHz	typical*4		+10 dBm at 220 GHz
			typical			typical

*1 Equivalent average noise level at 1 kHz bandwidth.

*2 Maximum amplitude variation across each waveguide mixer band (with peaking control optimized at each frequency in response to a -30 dBm CW input signal to the mixer).

*3 Maximum reference level error with respect to the internal calibrator. Amplitude accuracy can be improved 3 dB by measuring amplitude with respect to a known external (waveguide) reference signal.

*4 Over any 5 GHz bandwidth for millimeter wave mixers above 60 GHz.



140 GHz to 220 GHz Frequency Range —

Order WM 490G \$3,325

18 GHz to 40 GHz Set Contains WM 490K, WM 490A —

Order WM 4902 \$2,520

18 GHz to 60 GHz Set Contains WM 490K, WM 490A and WM 490U —

Order WM 4903 \$4,200

18 GHz to 90 GHz Set Contains WM 490K, WM 490A, WM 490U and WM 490E —

Order WM 4904 \$6,275

18 GHz to 140 GHz Set Contains WM 490K, WM 490A, WM 490U, WM 490E, and WM 490F —

Order WM 4905 \$8,550

Cable — Order 012-0649-00 \$50

Case — Order 016-0465-01 \$50

140 GHz to 220 GHz tapered transition 119-1729-00 used with WM 490F waveguide mixer \$650

General Purpose Waveguide Mixer and Set:

12.5 GHz to 18 GHz Frequency Range —

Order 119-0097-01 \$190

18 GHz to 26.5 GHz Frequency Range —

Order 119-0098-01 \$290

26.5 GHz to 40 GHz Frequency Range —

Order 119-0099-01 \$360

Cable — Order 012-0748-00 \$60

Case — Order 016-0465-01 \$50

12.5 GHz to 40 GHz Set Contains 119-0097-01, 119-0098-01, 119-0099-01 —

Order 016-0640-00 \$740

OPTIONAL ACCESSORIES

Microwave Comb Generator TM 500 Series Compatible —

Order 087-0885-00 \$1,800

75 a to 50 S/ Minimum Loss Pad —

Order 011-0112-00 \$60

DC Block BNC to BNC — Order 015-0221-00 \$85

FET Probe P6201 to 900 MHz — Order 010-6201-01 \$1,145

1405 TV Sideband Adaptor (525/60 Markers) — \$530

C-5C Camera — \$530

TV Trigger Synchronizer — Order 015-0261-01 \$395

Hard Case (Transit) — Order 016-0658-00 \$625

Soft Case — Order 016-0659-00 \$125

Lab Cart Model 3 — \$560

Note: 490 Series spectrum analyzers are compatible with all Tektronix C-50 Series cameras. Battery Pack 016-0270-02 is required for C-50, C-51, C-52 and C-53 Cameras.