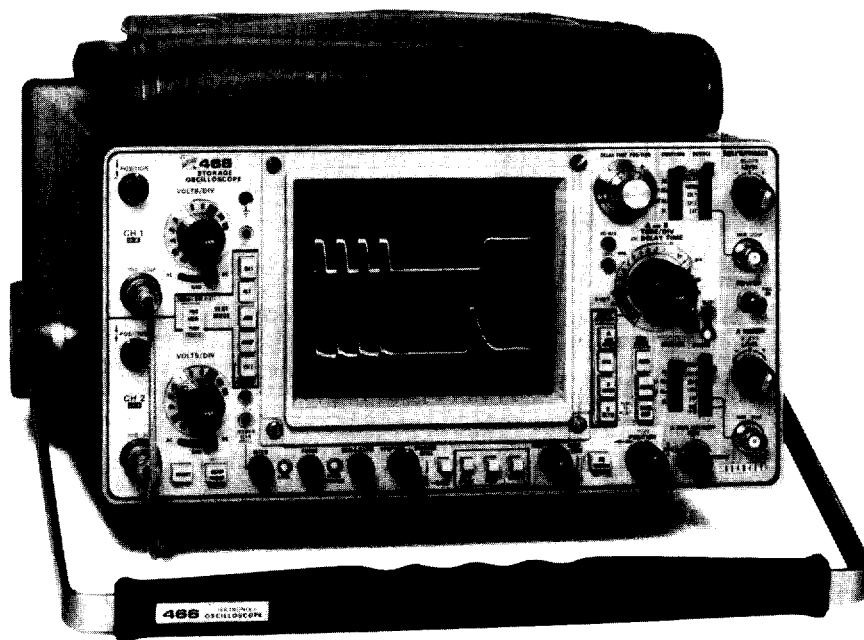


100 MHz Dual Trace Storage Oscilloscopes



466/464

100 MHz at 5 mV/div

5 ns/div Sweep Rate with X10 Sweep Magnifier

Variable Persistence and Fast Mesh Transfer Storage Modes

3000 div/ μ s Stored Writing Speed (466)

Battery Operation (optional)

Third Channel Trigger View now available on 466 and 464

Weights \approx 26 lb

The 466 and 464 Portable Storage Oscilloscopes are both designed to display non-repetitive or slow moving signals. And with the exception of stored writing speed on the 466, both instruments offer similar performance.

Operating in a reduced scan mode, the stored writing speed of the 466 is 3000 div/ μ s (1350 cm/ μ s). The lower cost 464 doesn't offer a reduced scan mode and stores at 110 div/ μ s. Both instruments feature two modes of storage — variable persistence and fast transfer.

The bright 8 x 10 cm CRT on both instruments comprises 0.90 cm/divisions. In the 466, reduced scan graticule is superimposed over the center of the main graticule, measuring 8 x 10 divisions with 0.45 cm/division. All graticules are etched onto the inner face of the CRT to eliminate parallax problems. A third channel trigger view option is now available for the 466 and 464. This option allows the simultaneous display of channels 1 and 2 with the external trigger.

Tektronix P6062B Probes provide operator convenience of 1X or 10X input attenuation at the probe tip. The correct deflection factor is automatically indicated on the 464 or 466 front panel when the probe attenuation factor is switched.

Light weight plus the ability to use optional, external dc power makes both the 466 and 464 sufficiently portable for virtually all field measurement applications. The snap-on 1106 Battery Pack is also useful in isolating these oscilloscopes from noisy or intermittent power sources.

CHARACTERISTICS

All characteristics apply to both the 466 and 464, except where indicated.

VERTICAL DEFLECTION (2 Identical Channels)

Bandwidth* and Rise Time — at all deflection factors from 50 Ω terminated source.

-15°C to +40°C	+40°C to +55°C
Dc to 100 MHz, \leq 3.5 ns	Dc to 85 MHz, \leq 4.15 ns

*Measured at -3 dB down. Bandwidth may be limited to approx 20 MHz by bandwidth limit switch. Lower -3 dB point, ac coupling 1X probe; 10 Hz or less. 10X probe; 1 Hz or less.

Deflection Factor — 5 mV/div to 5 V/div (1-2.5 sequence); accurate \pm 3%. Uncalibrated, continuously variable between steps and to approx 12.5 V/div. In cascade mode sensitivity is approx 1 mV/div. Cascaded bandwidth is at least 50 MHz when signal out is terminated in 50 Ω .

Display Modes — Ch 1, Ch 2 (normal or inverted), alternate, chopped (approx 250 kHz), added, X-Y.

CMRR — Common-mode rejection ratio at least 20 dB at 20 MHz for common-mode signals of 6 div or less.

Automatic Scale Factor — Probe tip deflection factors for 1X or 10X coded probes are automatically indicated by two readout lights behind the knob skirts. All lights are off when the channel is not displayed. Ground reference display selectable at probe (when dc coupled).

Input R and C — 1 M Ω \pm 2% paralleled by approx 20 pF.

Max Input Voltage —

Dc coupled	250 V (dc + peak ac)
	500 V (p-p ac at 1 kHz or less)
Ac coupled	500 V (dc + peak ac)
	500 V (p-p ac at 1 kHz or less)

Delay Line — Permits viewing leading edge of displayed waveform.

HORIZONTAL DEFLECTION

Time Base A — 0.05 μ s/div to 0.5 s/div (1-2.5 sequence). X10 mag extends sweep rate to 5 ns/div.

Time Base B — 0.05 μ s/div to 50 ms/div (1-2.5 sequence). X10 mag extends sweep rate to 5 ns/div.

Variable Time Control — Time Base A — Provides continuously variable uncalibrated sweep rates between steps and to at least 1.25 s/div. Warning light indicates uncalibrated setting.

Time Base A and B Accuracy — full 10 div

	+20°C to +30°C	-15°C to +55°C
Unmagnified	\pm 2%	\pm 3%
Magnified	\pm 3%	\pm 4%

Horizontal Display Modes — A, mixed sweep, A intensified, B delayed. B ends A for increased intensity in the delayed mode.

Calibrated Mixed Sweep — Displays A sweep for period determined by DELAY-TIME POSITION control, then displays B sweep for remainder of horizontal sweep.

CALIBRATED SWEEP DELAY

Delay Time Range — 0.2 to 10X delay time/div settings of 200/ns to 0.5 s (minimum delay time is 200 ns).

Differential Time Measurement Accuracy —

Delay Time Setting	+15°C to +35°C	-15°C to +55°C
over one or more major dial div	\pm 1%	\pm 2.5%
less than one major dial div	\pm 0.01 major dial div	\pm 0.025 major dial div

Jitter — 1 part or less in 50,000 (0.002%) of 10X the A sweep time/div setting.

TRIGGERING A and B

A Trigger Modes — Normal (sweep runs when triggered), automatic (sweep free-runs in the absence of a triggering signal and for signals below 30 Hz). Single sweep (sweep runs one time on the first triggering event after the reset selector is pressed). Lights indicate when sweep is triggered and when single sweep is ready.

A Trigger Holdoff — Adjustable control permits a stable presentation of repetitive complex waveforms. At least 10:1 variation.

B Trigger Modes — B starts after delay time (starts automatically at the end of the delay time), B triggerable after delay time (runs when triggered). The B (delayed) sweep runs once, in each of these modes, following the A sweep delay time.

Time Base A and B Trigger Sensitivity and Coupling —

Coupling		To 25 MHz	At 100 MHz
Dc	Int	0.3 div deflection	1.5 div deflection
	Ext	50 mV	150 mV
	Ext \div 10	500 mV	1.5 V
Ac	Ac Lf Reject	Requirements increase below 60 Hz	
	Ac Hf Reject	Requirements increase below 30 Hz and above 50 kHz	

Jitter — 0.5 ns or less at 100 MHz and 5 ns/div (X10 mag).

A Trigger View — A spring-loaded pushbutton overrides other vertical controls and displays the external signal used for A sweep triggering. This provides quick verification of the signal and time comparison between a vertical signal and the trigger signal. The deflection factor is approx 50 mV/div (0.5 V/div with external ÷ 10 source).

Level and Slope — Internal, permits selection of triggering at any point on the positive or negative slope of the displayed waveform. Level adjustment through at least ±2 V in external, through at least ±20 V in external ÷ 10.

A Sources — Norm, Ch 1, Ch 2, line, external and external ÷ 10.

B Sources — Starts after delay, norm, Ch 1, Ch 2, and external.

External Inputs — R and C approx 1 MΩ paralleled by approx 20 pF. 250 V (dc + peak ac) max input.

Third Channel Trigger View Specifications (Option 10)
Deflection Factor (Dc trigger coupling only)

EXT 100 mV/div ±5%

EXT ÷ 10 1 V/div ±5%

Delay difference (to Ch 1 or Ch 2) 3.5 ± 1 ns

Trigger point is approximately center screen.

Risetime ≤ 5 ns.

Aberration < 10% peak-to-peak.

X-Y OPERATION

Full Sensitivity X-Y (Ch 1 Horiz, Ch 2 Vert) — 5 mV/div to 5 V/div, accurate ±4%. Bandwidth is dc to at least 4 MHz. Phase difference between amplifiers in 3° or less from dc to 50 kHz.

DISPLAY

Crt — 8 x 10 div display, each div is 0.9 cm (normal); 0.45 cm/div (reduced scan). 8.5 kV accelerating potential, normal-mode, 10 kV reduced scan. P31 Phosphor.

Graticule — Internal, nonparallax; variable edge lighting; markings for measurement of rise time.

Beam Finder — Compresses trace to within graticule area for ease in determining the location of an off-screen signal. A preset intensity level provides a constant brightness.

Z-Axis Input — Dc coupled, positive-going signal decreases intensity; 5 V p-p signal causes noticeable modulation at normal intensity; dc to 50 MHz.

STORED WRITING SPEEDS

	466	464	Storage* View Time
Full Scan (Center 6 x 8 div; 0.9 cm/div)			
FAST	150 div/μs	110 div/μs	>15s
VARIABLE PERSISTANCE	0.5 div/μs	0.5 div/μs	>15s
Reduced Scan (Center 8 x 10 div; 0.45 cm/div)		Reduced Scan not available on 464	
FAST	3,000 div/μs		>15s
VARIABLE PERSISTANCE	3 div/μs		>15s

*These times are at full-stored display intensity; they can be extended at least 25 times using reduced intensity in SAVE Display Mode.

ENVIRONMENTAL CAPABILITIES

Ambient Temperature — Operating: -15°C to +55°C. Nonoperating: -55°C to +75°C. Forced air ventilation is provided.

Altitude — Operating: to 15,000 ft; max allowable ambient temperature decreased by 1°C/1000 ft from 5000 to 15,000 ft. Nonoperating to 50,000 ft.

Vibration — Operating: 15 minutes along each of the three axes, 0.06 cm (0.025 in) p-p displacement (4 g's at 55 Hz) 10 to 55 to 10 Hz in 1 minute cycles.

Humidity — Operating and nonoperating: 5 cycles (120 hours) to 95% relative humidity referenced to MIL-E-16400F (par 4.5.9 through 4.5.9.5.1, class 4).

Shock — Operating and nonoperating: 30 g's, ½ sine, 11 ms duration, 2 shocks per axis in each direction for a total of 12 shocks.

OTHER CHARACTERISTICS

Amplitude Calibrator —

Output Voltage	0.3 V	1% 0°C to +40°C
Output Current	30 mA	2% +20°C to +30°C
Frequency	Approx 1 kHz	

Vertical Signal Output — Ch 1 vertical signal is dc to at least 50 MHz and approx 25 mV/div terminated into 50 Ω, and approx 50 mV/div terminated into 1 MΩ.

Gate Outputs — Positive gates from both time bases (approx 5 V).

Power Requirements — Quick-change line voltage selector provides six ranges: 110 V, 115 V, 120 V, 220 V, 230 V, and 240 V, each ±10%. 48 to 440 Hz, 100 W max at 115 V and 60 Hz. Operation from 12 or 24 V dc is available with Option 07.

Dimensions	in	cm
Height (w/o pouch)	6.2	15.9
Width (with handle)	13.0	33.0
Depth (with panel cover)	21.7	55.0
Depth (handle extended)	23.5	59.7
Weights (approx)	lb	kg
Net (without panel cover or accessories)	26.0	11.8
Net (with panel cover and accessories)	29.8	13.5
Shipping	41.5	18.8

INCLUDED ACCESSORIES

Two P6062B Probes (010-6062-13), blue accessory pouch (016-0535-02), clear pouch (016-0537-00), CRT light filter (337-1674-01), two 1½-amp fuses (159-0016-00), one ¾-amp fuse (159-0042-00), adapter, ground wire (134-0018-01), viewing hood (016-0592-00).

ORDERING INFORMATION

466 Storage Oscilloscope \$6275

466 DM 44 Storage Oscilloscope/
Multimeter DM 44 info on p. 155 ... \$6670

464 Storage Oscilloscope \$5115

464 DM 44 Storage Oscilloscope/
Multimeter DM 44 info on p. 155 ... \$5610

INSTRUMENT OPTIONS

Option 01 delete DM 44 temperature probe (466 DM 44, 464 DM 44 only)..... Sub \$85

Option 04 Emc Modification Add \$135

Option 05 TV Sync Separator (Provides triggering on TV field) Add \$250

Option 07 Ext Dc Operation (Option 07 cannot be ordered with DM 44) .. Add \$210

Option 10 Third Channel Trigger View Add \$95 (Option 10 cannot be ordered with Option 05)

Modification kits for field conversion of existing 466s and 464s to Option 07 or DM 44 equipped scopes are available. These are typically more expensive than when the option is ordered with the instrument. Contact your Tektronix Field Engineer, Distributor, or Representative for information.

OPTIONAL ACCESSORIES

Probe Type	Attenuation	Input Impedance	Bandwidth* with 464/466
P6063B 6 ft	1X Switchable 10X	1 MΩ 105 pF 10 MΩ 14 pF	6 MHz 90 MHz
P6202 FET Probe 2 Meter	10X 100X Head Ac Head	10 MΩ 2 pF 10 MΩ 2 pF 10 MΩ 4 pF	100 MHz
Current Probe	Calibration	Insertion Impedance	Bandwidth with 464/466
P6022	1 mA/mV 10 mA/mV (Selectable)	0.03 Ω @ 1 MHz increasing to 0.2 Ω @ 120 MHz	85 MHz

*Bandwidths are measured at the upper -3 dB point, and apply only to the cable length shown. Generally, shorter cable lengths increase bandwidth, longer ones decrease bandwidth.

OPTIONAL ACCESSORIES

1106 Battery Pack (used with Option 07) \$850

1105 Battery Power Supply \$1100

Mesh Filter — Improves display contrast in high ambient light. Order 378-0726-01 \$33

Protective Cover — Waterproof vinyl. For 464/466 Order 016-0365-00 \$21

Folding Viewing Hood — Order 016-0592-00 \$12

Folding Binocular Hood — Order 016-0566-00 \$15

Polarized Collapsible Viewing Hood — Order 016-0180-00 \$27

SCOPE-MOBILE® Cart — Occupies less than 18 inches aisle space, has storage area in base. Order 200 C \$235

Rack Adapter — Order 016-0676-00 \$250 (Not for DM 44)

RECOMMENDED CAMERA

C-30BP Option 01 General Purpose Camera — Includes 016-0301-00 mounting adapter/corrector lens. Order C-30BP Option 01 \$1075

Camera Adapter — Mounts C-30B Series Camera to 464/466 Oscilloscopes. Order 016-0301-01 \$95

For further information see Camera section.

Tektronix offers maintenance training classes on instruments in the 400 Series and multi-media training packages on Digital Counter and Meter Concepts and Basic Oscilloscope Maintenance Concepts. For further training information, contact your local Field Office or request a copy of the Tektronix Customer Training Catalog on the return card at the back of this catalog.