

11301A 400 MHz Oscilloscope with integral 750 MHz counter/timer and 11302A 500 MHz Oscilloscope with micro-channel Plate CRT and integral 750 MHz counter/timer.

## 11300A Series

**GPIB**  
IEEE-488

The 11300A Series complies with IEEE Standard 488.1-1987, RS-232C, and with Tektronix Standard Codes and Formats.

### TYPICAL APPLICATIONS

- Timing Analysis of Complex Signals
- Waveform Characterization
- Component Evaluation

### BENEFITS

- Greatest Timing Accuracy
- Improved Measurement Confidence

### FEATURES

- Built-In 750-MHz Universal Counter/Timer with Counter View
- Up to 8 Traces Displayed Simultaneously
- Menu-Driven Touch-Screen Operation
- Automatic Display of Selected Signals
- Automatic Time and Amplitude Measurements
- Dual Delayed Sweeps
- 6-cm/ns Visual Writing Rate (11302A)
- Large 6.5-Inch Display (11301A)
- Fully Programmable via IEEE-488 & RS-232C

The 11301A and 11302A are easily the world's most versatile counter/timer analog oscilloscopes. These oscilloscopes are fully programmable via either IEEE-488 or RS-232C, with any RS-232 equipped personal computer. They are equally at home in the most complex automated production-test system or in smaller scale computer-assisted testing and data-logging applications in the engineering environment. For manual operation, the menu-driven touch-screen operator interface places the 11301A and 11302A a step beyond anything presently available in convenience of use. Manual control of the instruments, including their plug-ins and probes, is accomplished by means of a few pushbuttons and two user-definable knobs located in the vicinity of the cathode-ray tube and the touch-panel CRT screen itself. Operator menus on the screen guide the user through the selection of the functions to be performed; selection is made by touching the designated areas of the screen.

CRT readout displays oscilloscope and plug-in settings, as well as numeric readout of desired measurements; no more need to count or interpolate between graticule divisions. Using IEEE-488 or RS-232C, up to eight lines of user-generated text (50 characters per line) can be displayed on the CRT for operator prompts, measurement annotation, and computer-generated menus. The large CRT screen provides clear, crisp display of both text and traces.

### Wide Choice of Plug-Ins

A choice of five amplifier plug-ins provides display of up to eight traces at 250-MHz bandwidth, four traces at 400 MHz, or two traces at 500 MHz. The differential-comparator amplifier unit provides fast overdrive recovery from signals as high as 8 V at 1-mV/div sensitivity.

The 11301A and 11302A each accept up to three of the 11000-Series plug-in units. Signals from the amplifier plug-ins may be directed to either the vertical or horizontal system of the oscilloscope where they may be time shared with main or delayed sweeps. This allows an almost unlimited number of combinations of X-Y and Y-T traces to be displayed simultaneously to provide detailed views of signal relationships. Timed X-Y traces may be displayed through the application of delayed sweeps to X-Y displays.

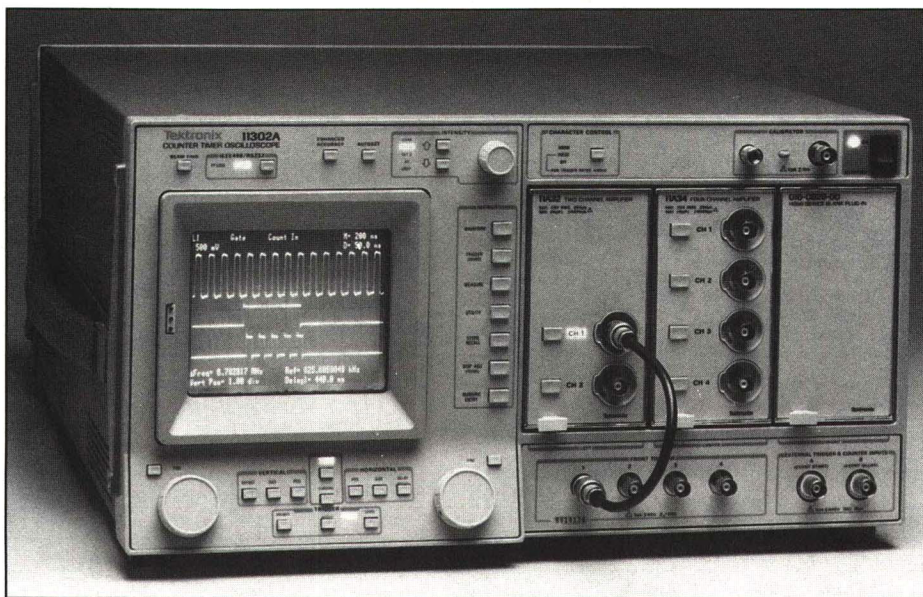
Each of the inputs on each of the plug-ins is supported by the new TEKPROBE™ interface which, in addition to the high-quality signal path, also provides probe power for active probes and a communication link between the probe and the oscilloscope.

### Built-In 750-MHz Universal Counter/Timer

The built-in 750-MHz Universal Counter/Timer, with its 2-ns single-shot resolution, performs as an integral part of the 11301A/11302A. This combination of high-performance counter and high-performance oscilloscope greatly simplifies the most difficult counter/timer measurements and provides measurement capabilities not possible with conventional counter/timers. A counter-view trace indicates to the operator exactly what portions of a signal are being measured by the counter/timer. This completely eliminates the concern that usually accompanies the measurement of complex signals with a conventional counter, whether what is being measured is really what the operator thinks is being measured.

The combination of integral oscilloscope and counter/timer allows you to make counter/timer measurements on any of 12 plug-in input channels or on the signals at the A and B External Trigger/Counter Inputs. Use of the A and B External Trigger/Counter Inputs allows the use of the counter/timer without tying up the oscilloscope functions of the instrument.

TEKPROBE is a trademark of Tektronix, Inc.



11302A 500 MHz Oscilloscope with Micro-channel Plate CRT and integral 750 MHz Counter/Timer.

### High-Writing-Rate CRT in 11302A

The microchannel-plate CRT of the 11302A provides 6-cm/ns visual writing rate, bright enough to view the fastest single-shot transient in normal ambient room light. This allows viewing of intermittent glitches in the midst of bright repetitive signals at the full bandwidth of the scope.

### Automatic Display Setup

The Autoset feature provides scaled, triggered display of the selected signal immediately, automatically, with the simple press of a button on the front panel or at the probe tip where the user's attention is focused.

### Automatic Measurements

The press of a front-panel pushbutton and a touch of the touch screen provides automatic time and amplitude measurements, without further operator intervention. This automatic measurement sequence can also be invoked via the probe-tip pushbutton, allowing the operator to display the results of up to eight measurements without removing hands or attention from the circuit under test.

### Cursors

Both vertical and horizontal cursors can be displayed to aid in making amplitude and timing measurements. Cursor scaling permits percentage, dB, and degree comparisons without the need for calculations. The results of the measurements are always displayed numerically on the screen, with appropriate units of measure.

### Built-In Time Bases

Two built-in time bases provide sweep rates to 500 ps/div. The dual delayed sweeps provide magnification of any portion of the displayed waveforms and allow precise comparison of two signals occurring at different times in the same or different signal paths.

### Display Versatility

The versatile and convenient trace definition capability of the 11301A and 11302A permits up to eight traces to be displayed simultaneously in a wide variety of signal combinations. Signals from separate plug-ins can be added or subtracted; YT and XY signals can be displayed simultaneously.

A nonvolatile time and date clock can be displayed for documentation of photographs. The clock setting is constantly available over the bus for time documentation of accumulated data in automated testing situations.

### Holdoff

Holdoff provides the means of holding off the occurrence of the main sweep until a selected amount of time or number of events has occurred. This capability is essential in inspecting groups of pulses or events, particularly when they are not synchronized with any controllable framing pulse.

The 11301A and 11302A offer several modes of holdoff. Holdoff by time is settable either as a function of main-sweep time/division or in 2-ns increments up to 0.99 seconds. Holdoff by events is settable up to 500,000 events.

The Countdown Holdoff function allows the sweep to be triggered on every Nth event within a pulse train. The Trigger-On-Next/Trigger-On-Previous function allows the user to move forward and backward through the pulse train in order to select the desired triggering point within the pulse train. Thus, any pulse within the pulse train can be inspected in detail and easily compared to other events occurring within a circuit at the same time.

The Holdoff by Events function permits the main sweep to run immediately, or be armed for triggering by another signal source, after N events following a selected start event. This function, in effect, permits four-deep "stacking" of delaying events: a start event, followed by a selected number of holdoff events, followed by a main-sweep triggering event, followed by the running or triggering of one or both delayed sweeps.

### Calibrated Fine Settings

A fine-settings mode provides calibrated sweep timing and vertical sensitivity to 1% increments between the conventional 1-2-5 settings. This permits the operator to take advantage of full scale, vertically or horizontally, for increased measurement accuracy.

### Stored Front-Panel Setups

Up to 10 complete front-panel setups can be stored and recalled for immediate setup of all instrument controls for repetitive testing. Manual sequencing of the stored setups can be accomplished by means of the pushbutton at the probe tip. This allows the operator, probing from point to point within a circuit, to reset the entire oscilloscope for each test point without removing attention from the device being tested.

### Reference Waveforms

On-board storage and display of two reference waveforms can provide templates for quick visual go/no-go comparison of complex waveforms. These reference waveforms can be created by a computer or captured by a waveform digitizer and downloaded to the oscilloscope's internal memory.

### Direct Numeric Entry, with Arithmetic Operators

A touch-screen keypad permits immediate numeric entry of scale factors, holdoff events, offsets, counter/timer, cursor null references, etc.

## CHARACTERISTICS

### VERTICAL SYSTEM

**System Bandwidth**—Determined by main frame and plug-in. (See Maximum Bandwidth Matrix below at the right.)

**Accuracy**—Determined by mainframe and plug-in. See descriptions.

**ΔDelay Between Channels**—Adjustable ±500 ps.

**Vertical-System Delay**—At least 20 ns of the sweep is displayed ahead of the triggering event.

### HORIZONTAL SYSTEM

**Main-Sweep Timing Range**—5 ns to 0.5 s/div in 1-2-5 steps, plus 1% increments between steps and to 1.0 s/div. X10 Mag extends maximum sweep rate to 500 ps/div.

**Delayed-Sweep Timing Range**—5 ns to 0.5 s/div, plus 1% increments between steps and to 1.0 s/div. X10 Mag extends maximum sweep rate to 500 ps/div.

**ΔTime Accuracy Using Cursors**—±(0.5% of time interval plus 0.03 div).

**ΔTime Accuracy Using Delayed Sweep**—±(0.03% of time interval plus 0.01 div).

**X-Y Operation**—From Center Plug-In: Horizontal bandwidth is dc to 3 MHz; phase difference between X and Y with normal bandwidth is 1° or less from dc to 1 MHz, 3° or less from 1 to 2 MHz.

### TRIGGERING

Minimum p-p signal required for stable triggering from A and B external inputs. Triggering sensitivity can be adjusted to reject unwanted noise components on noisy signals.

**DC Coupled**—0.35 div from dc to 50 MHz; increasing to 1.0 div at system bandwidth.

**AC Coupled**—0.35 div from 50 Hz to 50 MHz, increasing to 1.0 div at system bandwidth.

**HF Reject Coupled**—0.5 div from dc to 30 kHz.

**LF Reject Coupled**—0.5 div from 80 kHz to 50 MHz, increasing to 1.0 div at system bandwidth.

**TV Trigger**—Triggers from TV line or TV field sources; 0.5 div or less required for stable composite TV triggers.

**DC Coupled**—20 mV from dc to 50 MHz, increasing to 150 mV at system bandwidth.

**AC Coupled**—20 mV from 50 Hz to 50 MHz, increasing to 150 mV at system bandwidth.

**HF Reject Coupled**—28 mV from dc to 30 kHz.

**LF Reject Coupled**—28 mV from 80 kHz to 50 MHz, increasing to 150 mV at system bandwidth.

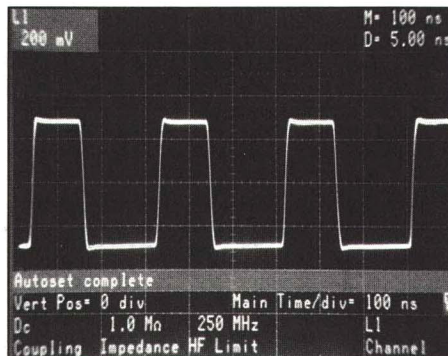
### HOLDOFF

**Holdoff By Time**—Range: At least 20 times the inherent minimum reset time of the sweep (function of time/div).

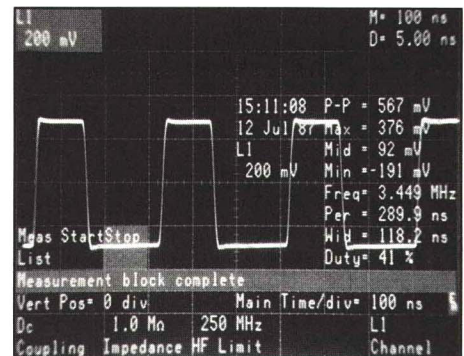
**Holdoff By 2-ns Step**—Settable in 2-ns increments from minimum inherent period of the sweep (function of Time/div) to 966 msec.

**Countdown Holdoff**—Settable from 2 to >500 million events. Maximum event frequency is 100 MHz.

**Holdoff By Events**—Settable from 2 to >500 million events. Maximum event frequency is 500 MHz. (One Start mode limits event frequency to 100 MHz.)



A press of a button at the probe tip or on the front panel automatically sets up the controls of the 11300A oscilloscopes for a triggered on-screen display of the selected signal.



The 11300A oscilloscopes make up to eight measurements, automatically, on the selected signal.

### 11000-SERIES MAXIMUM BANDWIDTH MATRIX

Plug-In	11302A	11301A
11A71 Single Channel, 10 mV/div, 50 Ω	500 MHz	400 MHz
11A52 Dual Channel, 1 mV/div, 50 Ω	400 MHz	350 MHz
11A32 Dual Channel, 1 mV/div, 1 MΩ/50 Ω	350 MHz	300 MHz
11A34 Four Channel, 1 mV/div, 1 MΩ/50 Ω	250 MHz	250 MHz
11A33 Differential Comparator, 1 mV/div, 50 Ω/1 MΩ/1 GΩ	150 MHz	150 MHz

### BUILT-IN COUNTER/TIMER

**Modes**—Frequency, Period, Width, Ratio, Time A-B, Totalize.

**Number of Digits**—Up to 7; up to 10 with optional high-stability time base (Option 1T). (System computes and displays proper number of valid digits for specific measurement.)

**Averaging**—Selectable in two-decade steps (1, 10<sup>2</sup>, 10<sup>4</sup>, 10<sup>6</sup>, etc.) up to 10<sup>10</sup> for frequency, period, width, ratio, and time A-B measurements. Auto Average provides maximum resolution achievable with a 3 readings/s update rate.

**Gating**—Via External B input or internal delayed sweep gate, or open on External A and close on External B. Minimum external gate width: <25 ns.

**Counter View**—Shaped 1-div p-p display of any one or more of the following signals: Counter In, Gate, Sync Gate, A External Input, B External Input.

**Sensitivity**—Via Plug-In Inputs: 2X sweep-triggering sensitivities. Via External A and B Inputs: <100 mV p-p dc to 100 MHz, increasing to 500 mV p-p at 500 MHz.

**Counter Ref Clock In/Out**—Connector on rear panel allows application of 0-dBm 10-MHz external clock.

**Trigger-Level Range**—Plug-Ins: ±10×size/div setting. External A and B Inputs: ÷1, ±500 mV; ÷5, ±2.5 V.

**Trigger-Level Accuracy**—Internal: Add ±2% to plug-in unit's ΔV DC term (where ΔV is the Level Readout minus Amplifier Offset) divided by V/div, add 0.3 div to DC Balance term, and add peak noise in divisions. (Peak noise is 5×RMS.)

External A and B Inputs (for signals with 10% to 90% transition time >10 ns)—

÷1 (max signal, ±1V): ±[3% of setting + 4%

of p-p signal + 10 mV + (0.5 mV times probe attenuation factor)].

÷5 (max signal, ±5 V): ±[3% of setting + 4% of p-p signal + 50 mV + (0.5 mV times probe attenuation factor)].

### FREQUENCY

**Range**—<1 MHz to 750 MHz.

**LSD**—Greater of  $\frac{1.8 \text{ ns} \times F^2}{N}$  rounded to the next higher decimal digit, or 1 count.

**Resolution**—Greater of LSD ±1.4 (TJE)F<sup>2</sup>/N.

**Accuracy**—Resolution ±F (TBE).

### PERIOD

**Range**—2 ns to 1250 hrs.

**LSD**—1.8 ns/N

**Resolution**—LSD ±1.4 (TJE)/N.

**Accuracy**—Resolution ±TBE (P).

### WIDTH

**Range**—2 ns to 1250 hrs.

**Maximum Repetition Rate**—200 MHz.

**LSD**—2 ns (for N=1);  
10 ns/√N (for N>1).

**Resolution**—(LSD ±1.4 (TJE)<sub>L</sub> ±1.4 (TJE)<sub>T</sub>)/√N ±2 ps.

**Accuracy (Gated and Nongated)**—Resolution ±Width (TBE)  
±Hysteresis error  
±TLE/(Slew<sub>E</sub> - Slew<sub>S</sub>) ±1 ns.

### TOTAL

**Range**—0 to 10<sup>15</sup> counts (engineering notation used above 10 digits).

**Repetition Rate**—>0 to 500 MHz.

**LSD, Resolution, and Accuracy**—1 up to 10<sup>11</sup>-1,

**Elapsed Time Range**—25 ns to 1250 hrs.

### RATIO

**Range**— $10^{-11}$  to  $10^{11}$ .  
**Frequency Range**—1 Hz to 400 MHz.  
**LSD**—Ratio/ $10^{10}$ .  
**Resolution**— $LSD \pm 1.4 (TJE_D) N_D \pm 1.4 (TJE_M / N_M) \pm F_D^2 \pm F_M F_D$  where N refers to trigger events.  
**Accuracy**—Same as resolution.

### TIME INTERVAL

#### (Main and Delay Trigger Sources)

**Range**—2 ns to 1250 hrs.  
**LSD**—2 ns (for N=1);  
 $10 \text{ ns} / \sqrt{N}$  (for N>1).  
**Resolution**— $\pm LSD \pm (1.4(TJE_M) + TJE_D) / \sqrt{N} + 2 \text{ ps}$ .  
**Accuracy**— $\pm (TBE)(\text{Time Interval}) \pm \text{Resolution} \pm \text{Plug-In Delay Mismatch} \pm TLE_M / \text{Slew} - TLE_D / \text{Slew} \pm 200 \text{ ps}$ .

**Maximum Repetition Rate**—200 MHz.  
**Channel Delay Mismatch**—Not more than  $\pm 500 \text{ ps}$  (without null).

### STANDARD TIME BASE

**Frequency at Calibration**—10 MHz  $\pm 1 \text{ Hz}$ .  
**Temperature Stability**— $\pm 50 \text{ Hz}$ , 0 to 50°C (5 ppm).  
**Aging**— $< 10 \text{ Hz/year}$  (1 ppm).  
**Adjustment Resolution**—0.5 Hz.

### HIGH STABILITY TIME BASE (OPTION 1T)

**Frequency at Calibration**—10 MHz  $\pm 0.2 \text{ Hz}$ .  
**Temperature Stability**— $\pm 2 \text{ Hz}$ , 0 to 50°C.  
**Warm-Up Time**—10 minutes at 25°C to within 0.2 ppm of final frequency.  
**Aging**— $< 1 \times 10^{-8}$ /day at time of shipping.  
 $< 4 \times 10^{-8}$ /week after 30 days continuous operation.  
 $< 1 \times 10^{-6}$ /year after 60 days continuous operation.  
**Short-Term Stability**— $< 1 \times 10^{-9}$  RMS based on 60 consecutive 1-s measurements.  
**Adjustment Resolution**—0.2 Hz.

**Adjustment Range**—Sufficient for 8 years of aging.

### DEFINITION OF TERMS

**LSD** = The smallest amount that the display can change.  
**N** = Number of events in a measurement interval.  
**P** = The period of the signal being measured.  
**RESOLUTION** = The amount an input signal must change to be assured of a change on the display.

**TBE** = Time-base error.

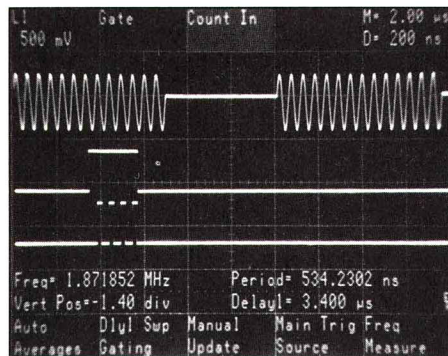
**TJE** = Trigger-jitter error (in seconds RMS) =

$$\frac{\sqrt{(e_n S)^2 + (e_n P)^2 + (e_n M)^2}}{\text{input-signal slew rate}}$$

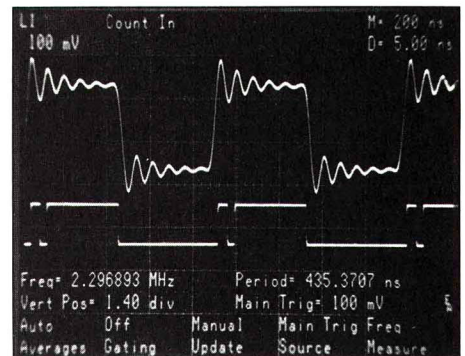
where  $e_n S$  = Input-signal RMS noise voltage  
 $e_n P$  = RMS noise voltage contributed by plug-in (see plug-in characteristics).

$e_n M$  = 0.05 div when using plug-in;  
 5 mV when using Ext. A or B input.

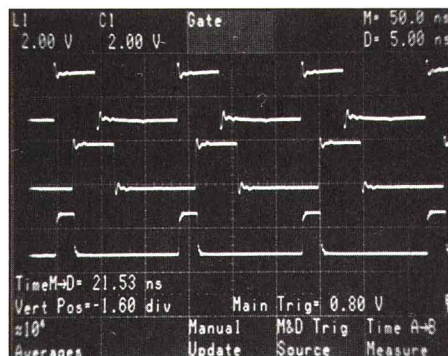
**TLE** = Trigger-level error; error resulting from the actual trigger point being different from the set trigger point.



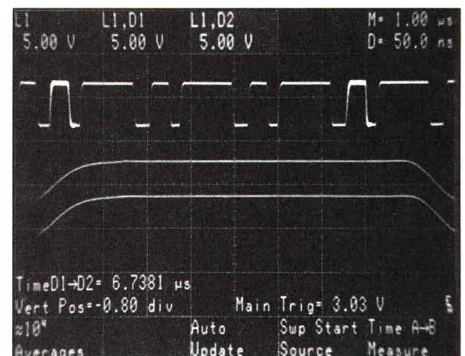
The 11300A oscilloscope delayed sweep supplies the gating signal (middle trace) for burst measurements. The Count In trace (bottom trace) shows the events being counted during the gate interval.



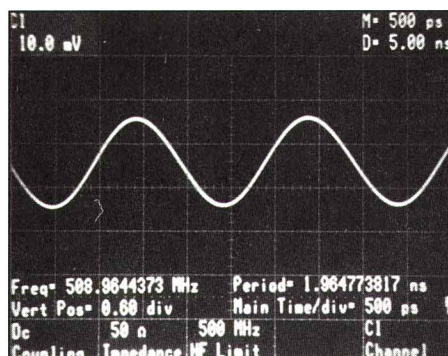
The Count In trace (lower trace) shows clearly that the counter/timer is miscounting because of the ripple on the top of the signal.



Here the 11300A universal counter/timer measures 21.53 nanoseconds of propagation delay between the leading edge of signal L1 (left plug-in, channel 1) and the leading edge of signal C1 (center plug-in, channel 1). Gate trace (bottom trace) clearly shows the time interval being measured.



Very accurate pulse-to-pulse timing measurements within a complex pulse train are made simple with the 11300A universal counter-timer and dual delayed sweeps.



The 500-MHz combination of 11302A main-frame and 11A71 single-trace amplifier allows accurate frequency measurements of small signals to 750 MHz or more with 11300A's built-in universal counter/timer.

**EXTERNAL CONNECTORS**

**Camera Power**—3-pin connector next to CRT is compatible with Tektronix C-50 Series cameras.

**Calibrator Output**—Front-panel female BNC connector. Square-Wave Mode: 5.0 V or 500 mV square wave into open circuit; 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz; 450-Ω output impedance. Fast-Rise Mode: 0.5 V into open circuit, 2-ns transition time into 50 Ω; 50-Ω output impedance; same frequencies as Square-Wave Mode plus 1 MHz.

**A and B External Trigger and Counter Inputs**—Front-panel female BNC connectors. Input impedance: 1 MΩ.

**Trigger Ready Output**—Rear-panel female BNC connector. TTL compatible; high state indicates Trigger-Ready condition.

**Trigger Reset Input**—Rear-panel female BNC connector. TTL compatible; high-to-low transition resets counter and/or single sweep.

**Sweep Gate Output**—Rear-panel female BNC connector. TTL compatible; high state indicates gate running. Main or delayed gate out selectable through UTILITY menu.

**Left Vertical Out**—Rear-panel female BNC connector. Output-signal amplitude=100 mV/div ±10% of displayed signal. Bandwidth=dc to 100 MHz. Output impedance=50 Ω ±10%.

**Counter Ref Clock In/Out**—Rear-panel BNC connector. See Counter/Timer description.

**Main-Sweep Output**—Rear-panel female BNC connector. Positive-going ramp, 0 to 5 V, coincident with main sweep: Output impedance: 950 Ω.

**Z-Axis Input**—Rear-panel female BNC connector. Positive voltage decreases intensity; +3 V blanks a maximum-intensity trace.

**RS-232-C**—25-pin "D" female connector configured as DCE.

**IEEE-488**—24-pin female connector for connecting instrument to GPIB.

**CRT AND DISPLAY FEATURES**

**Standard CRT**—11301A: 8×10 div (1.22 cm/div); P31 phosphor. 11302A: 8×10 div (1.0 cm/div); P31 phosphor. 11302A Writing Speed: 10 div/ns single-shot visual writing speed in 20 fC ambient illumination.

**POWER REQUIREMENTS**

**Line Voltage**—90 to 132 V ac, and 180 to 250 V ac.

**Line Frequency**—48 to 440 Hz.

**Maximum Power Consumption**—240 W.

**ENVIRONMENTAL AND SAFETY**

**Temperature**—Operating: 0 to +50°C. Nonoperating: -45 to +75°C.

**Humidity**—Operating and Nonoperating: Up to 95% relative humidity, up to 50°C.

**Altitude, Vibration, Shock, and Bench Handling**—Meets MIL-T-28800C, Type III, Class 5.

**Electromagnetic Compatibility**—Meets MIL-T-28800C; MIL-STD-461B; FCC Part 15, Subpart J, Class B; VDE 0871/6.78 Class B; CE-01 Part 4, with exceptions; CE-03 Part 4, Curve 1; CE-03 Part 4, Curve 4, Navy, NB, BB (with exceptions); CS-01 Part 7; CS-02 Part 4 (with exceptions); CS-06 Part 5; RE-01 Part 4 (with exceptions); RE-02 Part 4; RS-01 Part 4; RS-03 Part 7 (limited to 1 GHz).

**Safety**—Listed UL 1244; CSA Bulletin 556B, September 1973; Tektronix self-certification to comply with IEC 348 recommendations.

**ORDERING INFORMATION**

**11301A** 400-MHz Programmable Counter/Timer Analog Oscilloscope **\$8,550**

Includes: Operator manual (070-7174-00); User Reference Guide (070-7175-00); User Pocket Reference (070-7176-00).

**11302A** 500-MHz Programmable Counter/Timer Analog Oscilloscope With Micro-channel-Plate CRT **\$12,950**

Includes: Same as 11301A.

**OPTIONS**

**Option 1C**—Adds four additional rear-to-front feedthroughs to the existing standard four; total of eight. **+\$150**

**Option 1R**—Rackmount **+\$250**

Includes: Hardware, tooling, and instructions for converting bench model to rackmount configuration.

**Option 1T**—High stability Counter/Timer. **+\$325**

**Option 25**—Adds PEP301 Instruments/System Controller and S47P103 utilities software. **+\$7,870**

**For more information on utility and application software, see the Test and Measurement Software Section.**

**CONVERSION KITS**

**Rackmount Adapter**—To convert standard 11301A or 11302A to Option 1R. Order 040-1214-01 **\$250**

**High-Stability Counter/Timer**—To convert standard 11301A or 11302A to Option 1T. Order 040-1232-00 **\$325**

**Four-Cable Feedthrough**—To convert standard 11301A or 11302A to Option 1C. Order 040-1233-00 **\$175**

**INTERNATIONAL POWER PLUG OPTIONS**

**Option A1**—Universal Euro 220 V, 50 Hz.

**Option A2**—UK 240 V, 50 Hz.

**Option A3**—Australian 240 V, 50 Hz.

**Option A4**—North American 240 V, 60 Hz.

**Option A5**—Switzerland 220 V, 50 Hz.

**OPTIONAL ACCESSORIES**

**11301A Service Manual**—Order 070-7178-50 **\$175**

**11302A Service Manual**—Order 070-7179-50 **\$175**

**Cables**—

(GPIB) 2 m. Order 012-0991-00 **\$160**

(RS-232) 10 ft. Order 012-0911-00 **\$100**

**Blank Panel**—For filling empty plug-in compartments. Order 016-0829-00 **\$95**

**DIGITIZING CAMERA SYSTEM**

**DCS01**—Digitizes waveforms or single-shot signals to the full oscilloscope bandwidth to allow analysis with a personal computer. **\$6,500**

See page 453 for complete ordering information.

**RECOMMENDED ACCESSORIES**

**Cameras**—See Camera and Mounting Adapter Selection Guide in the Instrumentation Documentation Devices section.

**Probes**—See recommended probes on page 282.

**Cart**—K217. See Instrument/Cart compatibility chart in the Cart Section. **\$510**

**TECHNICAL ASSISTANCE SERVICES**

**When you need technical assistance to supplement your own resources, Tektronix can arrange the services of an application engineer skilled in meeting your needs. For more information, see the Total Solution Section, page 35.**

**TRAINING**

**Tektronix Instrument Group Customer Training offers operation and application training to help you get full value out of your instrumentation investment. Information is in the Customer Training Section. For further information, or to enroll, call us at 1-800-835-9433 ext. 430. In Oregon call collect 1-629-1017.**

**PHYSICAL CHARACTERISTICS**

Instrument	11301A		11302A		Rackmount	
	mm	in.	mm	in.	mm	in.
<b>Dimensions</b>						
Width, with handle	447	17.6	447	17.6	482	19.0
Height, with feet	239	9.4	239	9.4	222	8.8
Depth	581	22.9	581	22.9	548	21.6
<b>Weight ≈</b>	<b>kg</b>	<b>lb</b>	<b>kg</b>	<b>lb</b>	<b>kg</b>	<b>lb</b>
Net	18.1	40.0	20.0	44.0		
Shipping	21.8	48.0	23.6	52.0		