

7B50A
7B53A

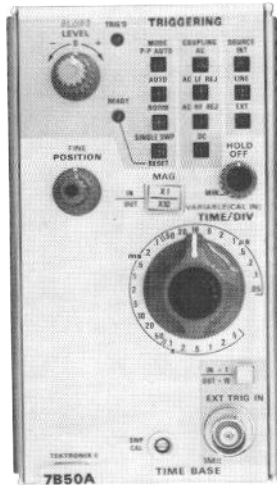
7000-Series Oscilloscopes

Time Bases

With compliments

Helmut Singer Elektronik

www.helmut-singer.de info@helmut-singer.de
fon +49 241 155 315 fax +49 241 152 066
Feldchen 16-24 D-52070 Aachen Germany



7B50A

5 ns/div to 5 s/div Calibrated Time Base

Triggering to 150 MHz

Variable Trigger Holdoff

Peak-to-Peak Auto Triggering

Single-Sweep Operation

The 7B50A Time Base is recommended for use with 7313 and 7600-Series mainframes to provide optimum bandwidth/sweep-speed compatibility. It may, however, be used in any 7000-Series mainframe. The fastest rate (5 ns/div) is obtained with the X10 MAGNIFIER.

This new time base features expanded capability in maximum triggering frequency — now 150 MHz — and in the addition of variable trigger holdoff—for stability on lengthy asynchronous data trains.

Twelve pushbutton positions program triggering mode, coupling method, and source. For routine applications, hands-off triggering is accomplished by actuating three switches: INT SOURCE, AC COUPLING, and P-P AUTO MODE. The P-P AUTO MODE provides a baseline trace in the absence of a signal and a triggered trace at any position of the LEVEL/SLOPE control when a signal of 0.5 div or greater is present. Except for the selection of + or - SLOPE this mode is automatic. The other triggering positions are useful for specific applications.

AC LF REJ attenuates undesirable trigger components below 30 kHz. AC HF REJ attenuates components above 50 kHz, which can cause triggering problems during low-frequency applications. Single-sweep functions with lighted READY indicator and manual reset are associated with the trigger mode controls.

X-Y displays are available with Option 2 installed. A front-panel button (DISPLAY MODE) selects either normal sweep or X-Y

display. Both signals are applied to vertical (Y) amplifiers and the desired horizontal (X) signal is then routed through plug-in and mainframe trigger paths to the 7B50A. An X-Y mode selection then applies the signal to the horizontal deflection system.

CHARACTERISTICS

Sweep Rates — 0.05 μ s/div to 5 s/div in 25 steps (1-2-5 sequence). 5 ns/div, the fastest calibrated sweep rate, is obtained with the X10 MAGNIFIER. The uncalibrated VARIABLE is continuous between steps to 12.5 s/div.

Sweep Accuracy — Measured over the center 8 div.

Time/Div	Unmagnified		Magnified	
	+15°C to +35°C	0°C to +50°C	+15°C to +35°C	0°C to +50°C
5 s/div to 1 s/div	4%	5%	5%	6%
0.5 s/div to 0.5 μ s/div	2%	3%	3%	4%
0.2 μ s/div to 0.05 μ s/div	3%	4%	4%	5%

(Fastest calibrated sweep rate is limited by some mainframes.)

Trigger Holdoff Time —

MIN Holdoff Setting	5 s/div to 1 μ s/div	2 times TIME/DIV setting or less
MIN Holdoff Setting	0.5 μ s/div to 50 ns/div	2.0 μ s or less
Variable Holdoff Range	Extends holdoff time through at least 2 sweeps lengths for sweep rates of 20 ms/div or faster	

Triggering —

Sensitivity (AUTO and NORM modes)

Coupling	Triggering Frequency Range ¹	Min Signal Required	
		Int	Ext
AC	30 Hz to 50 MHz	0.3 div	50 mV
	50 MHz to 150 MHz	1.5 div	250 mV
AC LF REJ ²	30 kHz to 50 MHz	0.3 div	50 mV
	50 MHz to 150 MHz	1.5 div	250 mV
AC HF REJ	30 Hz to 50 kHz	0.3 div	50 mV
	DC ³	0.3 div	50 mV
DC ³	50 MHz to 150 MHz	1.5 div	250 mV

¹ Triggering frequency ranges are limited to the frequency of the vertical system when operating in the internal mode.

² Will not trigger on sine waves of less than 8 div Int, or 3 V Ext, at or below 60 Hz.

³ Triggering Frequency Range for dc coupling applies to frequencies above 30 Hz when operating in the AUTO TRIGGERING MODE.

Sensitivity (P-P AUTO MODE) (Ac or Dc Coupling)

Triggering Frequency Range	Min Signal Required	
	Int	Ext
200 Hz to 50 MHz	0.5 div	125 mV
50 MHz to 150 MHz	1.5 div	375 mV

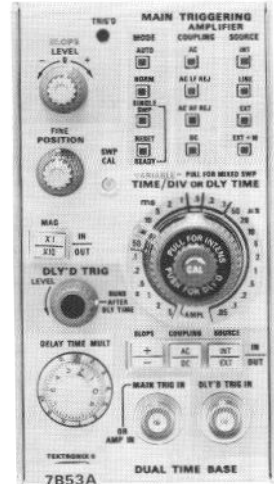
Option 2

X-Y Phase Shift — (Determined by the circuitry in mainframe) For mainframes without X-Y horizontal compensation, the mainframe phase shift specification is retained for frequencies of 50 kHz and below. For mainframes with optional X-Y horizontal compensation, the extra delay adds to the phase shift error above 50 kHz.

Order 7B50A Time Base

7B50A OPTION

Order Option 2, X-Y



7B53A

5 ns/Div to 5 s/Div Calibrated Time Base

Calibrated Mixed Sweep

Triggering to 100 MHz

Single-Sweep Operation

Optional Tv Sync-Separator Triggering

The 7B53A Dual Time Base is recommended for use with the 7600 and Storage Families to provide bandwidth/sweep-speed compatibility.

The 7B53A time base features four kinds of sweep: normal, intensified delaying, delayed, and mixed. The pushbutton switches cannot be lit.

TV SYNC

Option 5, Tv Sync Separator Triggering — Permits stable internal line or field rate triggering from displayed composite video or composite sync waveforms. Conventional waveform displays and measurements can be made from standard broadcast or closed circuit tv systems, domestic or overseas, with up to 1201-line, 60-Hz field rates. Individual lines may be displayed with delayed sweep features. The wide range of delayed sweeps permits accurate alternate-frame, color-burst observations in the PAL color system.

DELAYING SWEEP

Sweep Rate — 0.05 μ s/div to 5 s/div in 25 steps (1-2-5 sequence). 5 ns/div, the fastest calibrated sweep rate, is obtained with the X10 MAGNIFIER. The uncalibrated VARIABLE is continuous between steps and to 12.5 s/div. The variable control is internally switchable between main, delayed sweep, and variable main sweep holdoff.

Sweep Accuracy — Measured over the center 8 div.

Time/Div	Unmagnified		Magnified	
	+15°C to +35°C	0°C to +50°C	+15°C to +35°C	0°C to +50°C
5 s/div to 0.1 s/div and 0.2 μ s/div to 0.05 μ s/div	3%	4%	3.5%	5%
50 ms/div to 0.5 μ s/div	2%	3%	2.5%	4%

Delay Time Multiplier Range — 0 to 10 times the DELAY TIME/DIV setting from 5 s/div to 1 μ s/div.

Differential Delay Time Measurement Accuracy — 5 s/div to 1 s/div \pm 1.4% of measurement + 0.3% of full scale; 0.5 s/div to 1 μ s/div: \pm 0.7% of measurement + 0.3% of full scale. Full scale is 10 times the DELAY TIME/DIV setting. Accuracy applies over the center 8 DTM divisions from +15°C to +35°C.

Jitter — 1 part or less in 20,000 of X10 the TIME/DIV setting.

Triggering —

Coupling	Triggering Frequency Range	Min Signal Required	
		Int	Ext
Ac	30 Hz—10 MHz	0.3 div	100 mV
	10 MHz—100 MHz	1.5 div	500 mV
Ac Lf Rej*	30 kHz—10 MHz	0.3 div	100 mV
	150 kHz—10 MHz 10 MHz—100 MHz	1.5 div	500 mV
Ac Hf Rej	30 Hz—50 kHz	0.3 div	100 mV
Dc	Dc—10 MHz	0.3 div	100 mV
	10 MHz—100 MHz	1.5 div	500 mV

*Will not trigger on sine waves of 3 div or less INT or 1.5 V EXT below 120 Hz.

Single Sweep — Triggering requirements are the same as normal sweep. When triggered, sweep generator produces one sweep only until reset.

Internal Trigger Jitter — 1 ns or less at 75 MHz.

External Trigger Input — Max Input voltage is 500 V (dc + peak ac), 500 V p-p ac at 1 kHz or less. Input R and C is 1 M Ω within 2%, 20 pF within 2 pF. LEVEL range is at least +1.5 V to -1.5 V in EXT, at least +15 V to -15 V in EXT \div 10.

DELAYED SWEEP

Sweep Rate — 0.05 μ s/div to 0.5 s/div in 22 steps (1-2-5 sequence). 5 ns/div, the fastest calibrated sweep rate, is obtained with the X10 MAGNIFIER. The uncalibrated VARIABLE is continuous between steps to at least 1.25 s/div and is switchable between the main, delayed sweep, and variable main sweep holdoff.

Sweep Accuracy — Measured over the center 8 div.

Time/Div	Unmagnified		Magnified	
	+15°C to +35°C	0°C to +50°C	+15°C to +35°C	0°C to +50°C
0.5 s/div to 0.1 s/div and 0.2 μ s/div to 0.05 μ s/div	4%	5%	4.5%	6%
50 ms/div to 0.5 μ s/div	3%	4%	3.5%	5%

Delayed Sweep Gate — Output voltage is approx +3.5 V into at least 10 k Ω shunted by 100 pF or less, or 0.5 V into 50 Ω . Rise time is 50 ns or less; output R is 350 Ω within 10%. Gate is available at the DLY'D TRIG IN connector when the delayed sweep source switch is set to INT.

Triggering —

Coupling	Triggering Frequency Range	Min Signal Required	
		Int	Ext
Ac	30 Hz—10 MHz	0.3 div	100 mV
	10 MHz—100 MHz	1.5 div	500 mV
Dc	Dc—10 MHz	0.3 div	100 mV
	10 MHz—100 MHz	1.5 div	500 mV

Internal Trigger Jitter — 1 ns or less at 75 MHz.

External Trigger Input — Max input voltage is 500 V (dc + peak ac), 500 V p-p ac at 1 kHz or less. Input R and C is 1 m Ω within 2%, 20 pF within 2 pF. LEVEL range is at least +1.5 V to -1.5 V in EXT.

MIXED SWEEP

Sweep Accuracy — Within 2% plus measured main sweep error. Exclude the following portions of mixed sweep: first 0.5 div after start of main sweep display and 0.2 div or 0.1 μ s (whichever is greater) after transition of main to delayed sweep.

EXT HORIZONTAL INPUT

Deflection Factor — 10 mV/div within 10% when in EXT, MAG X10, 100 mV/div within 10% when in EXT; 1 V/div within 10% when in EXT \div 10.

Bandwidth

Coupling	Lower —3 dB	Upper —3 dB
	Ac	40 Hz
Ac Lf Rej	16 kHz	2 MHz
Ac Hf Rej	40 Hz	100 kHz
Dc	Dc	2 MHz

Order 7B53A Dual Time Base

7B53A OPTION

Order Option 5 TV Triggering

Option 5 — deletes ac line trigger and External \div 10 from trigger source.

7B85 Features:

Delay Time with CRT Readout

Δ Time with CRT Readout

Vertical Trace Separation Between Two Delayed Sweeps

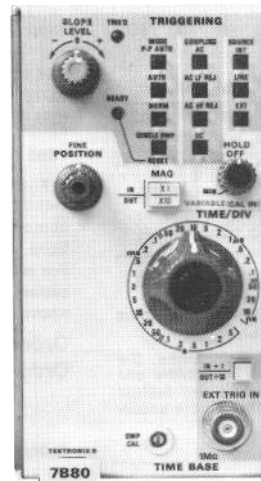
Both Feature:

1 ns/div to 5 s/div Calibrated Time Bases

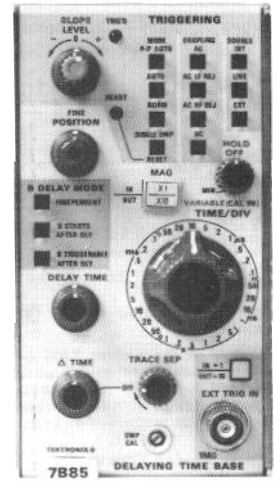
Triggering to 400 MHz

Variable Trigger Holdoff

Peak-to-Peak Auto Triggering



7B80



7B85

The 7B80 and 7B85 are horizontal time bases recommended for use with 7700-, 7800-, and 7900-Series mainframes to provide optimum bandwidth/sweep-speed compatibility. (Each may, however, be used in any slower 7000-Series mainframe with some reduction in sweep accuracy.)

Together they provide delaying sweep and dual delaying sweep with crt digital readout of Δ sweep time. The 7B85 provides the delaying and dual delaying sweep, while the 7B80 provides the delayed sweep.

Dual delays provide fast, accurate, and convenient timing measurements with the time difference read directly from the crt Δ time display. By overlapping the two expanded waveforms, or by aligning appropriate points on each to the same vertical graticule, the digital display indicates the desired Δ time measurement.

In a conventional delaying sweep mode, the time delay to the start of the delayed sweep is shown on the crt digital readout.

DELAY TIME knob adjusts the time to the first delayed sweep; the Δ TIME knob adjusts the time between the two delayed sweeps. Now, the prt digital readout shows the Δ time between the two delays.

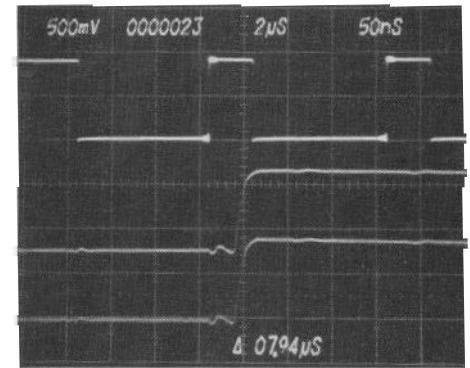


Fig 2. With the mainframe still selecting ALT sweeps, delaying and both delayed sweeps are shown. The digital readout on the lower crt edge shows the time between the two sweep delays. The TRACE SEPARATION knob is used to position the second delayed sweep below the first delayed sweep with up to 3 div of separation.

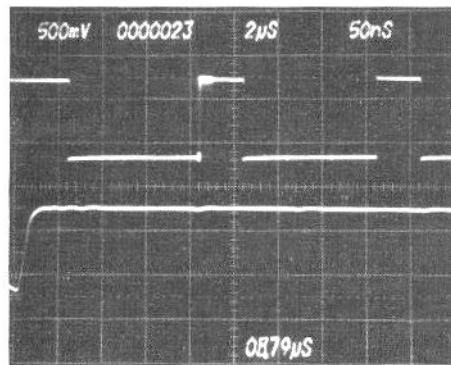


Fig 1. Delaying and delayed sweeps are shown with the mainframe selecting ALT sweep modes. The delay time to the start of the delayed sweep is digitally presented on the lower edge of the crt.

Either plug-in can be used separately as an independent single time base, or they can be combined in any mainframe with two horizontal compartments for delaying and delayed operation.

X-Y displays are available using a 7B80 with Option 2. A front-panel button (DISPLAY MODE) selects either normal sweep or X-Y display. Both signals are applied to vertical (Y) amplifiers, and the desired horizontal (X) signal is then routed through plug-in and mainframe trigger paths to the 7B80. An X-Y mode selection then applies the signal to the horizontal deflection system.

CHARACTERISTICS

Characteristics are common to both units unless otherwise noted.

Sweep Rates — 5 s/div to 10 ns/div in 27 steps (1-2-5 sequence). X10 MAGNIFIER extends fastest calibrated sweep rate to 1 ns/div. The uncalibrated VARIABLE is continuous to at least 2.5 times the calibrated sweep rate.

By rotating the TRACE SEPARATION control out of the Δ TIME OFF position, the Δ delay time mode is activated. Two intensified zones can be independently controlled. As in the conventional delay mode, the