

Waveform parameters at the touch of a key.

Dc to 400 MHz Bandwidth at 10 mV/div.

Calibrated sweep rates to 500 ps/div.

Stores repetitive waveforms up to 400 MHz (up to 14 GHz with 7S11/7S12 plug-ins).

Single-shot events and pretrigger up to 50 μ s/div (with 7B87 Time Base).

Signal averaging.

Resolution up to 0.01 div (10 bits).

Choice of 128, 256, 512, 1024 points/waveform.

Keystroke programming (up to 2000 keystrokes with Option 2D).

IEEE-488 interface (standard).

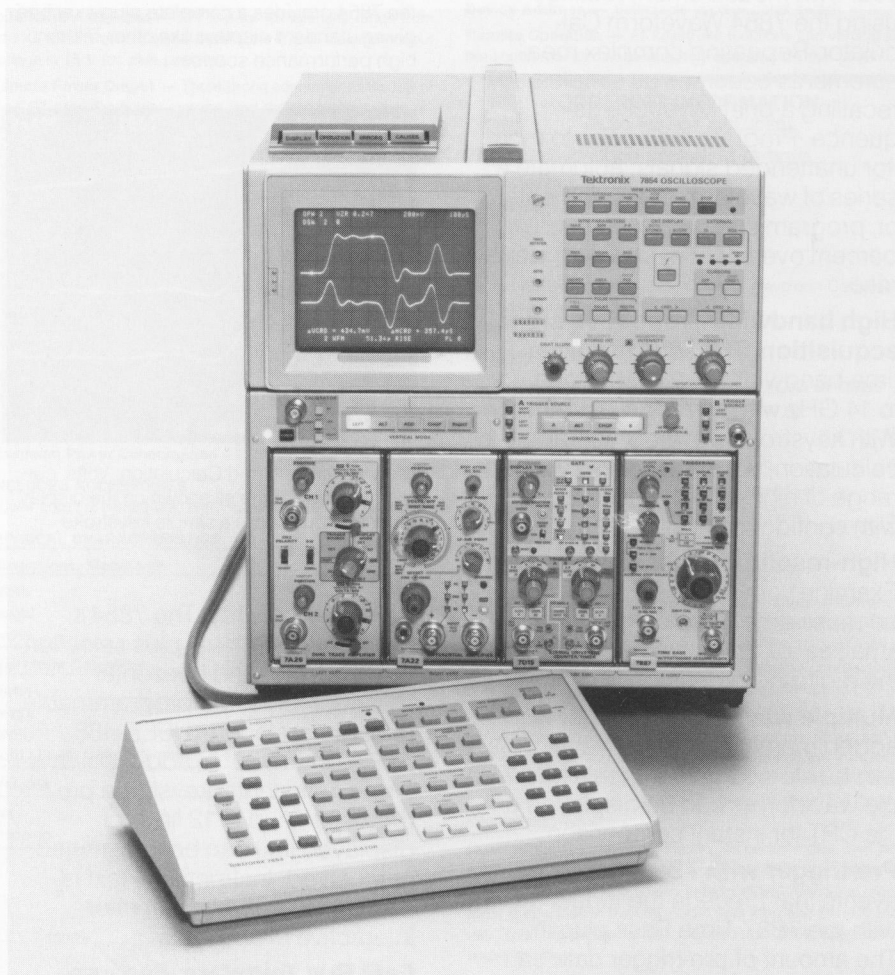
Over 30 compatible plug-ins.

The Tektronix 7854 Oscilloscope

gives you pushbutton solutions to common measurement problems that occupy your valuable time. Digital storage, waveform processing, and programmability combine with a superior analog instrument for powerful new capabilities. A member of the high performance 7000 Series of oscilloscopes, the 7854 can take advantage of over 30 specialized plug-ins, so you can tailor a test and measurement system to your specific needs.

The 7854 has advanced measurement technology and is a solid investment today that can expand to meet tomorrow's needs.

7854 WAVEFORM PROCESSING OSCILLOSCOPE



Parameters at the touch of a key.

No more counting divisions and multiplying figures while adjusting the display. For you it means saved time, increased accuracy, consistent measurements, and simple operation.

Accurate measurements. With the 7854's single and dual cursor measurement capability, you can select a portion of a waveform for parameter calculation or obtain the amplitude and time for single point or point-to-point measurements.

Noise Reduction. Averaging enables you to uncover signals buried in noise, improving measurement accuracy. The procedure is simple and flexible: average with a single keystroke, or select a specific averaging sequence with a combination of keystrokes.

Waveform processing. Powerful 7854 arithmetic functions enable you to process waveforms for the answers you need. For instance, perform simple multiplication of a voltage waveform by a current waveform to yield the instantaneous power waveform. The time savings is considerable, leaving you more time to draw creative conclusions from your data.

Keystroke programming. Create your own measurement routines using the 7854 Waveform Calculator. Repeating complex measurements becomes as simple as recalling a brief keystroke sequence. Program the scope to monitor unattended signals; automate a series of waveform measurements; or, program specific functions, like percent overshoot or standing wave ratio.

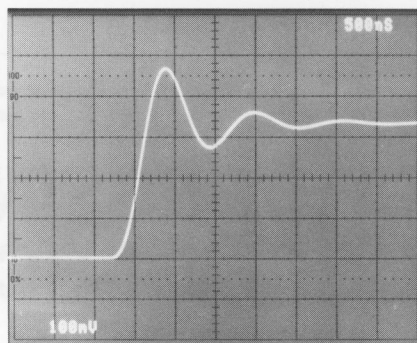
High bandwidth, repetitive signal acquisition. The 7854 has a real-time bandwidth of 400 MHz and up to 14 GHz with sampling plug-ins. With keystroke waveform parameter calculation, you can tackle a wide range of high-speed applications with confidence.

High-resolution measurements.

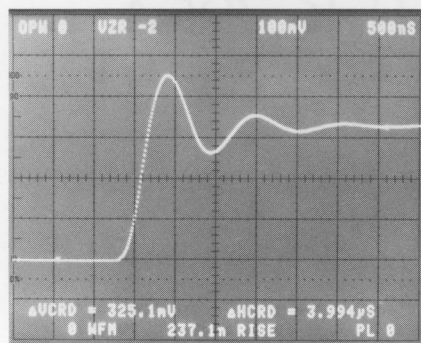
Examine your signals with precision, because amplitude differences as small as .01 division are recorded in the digitizing process.

Multiple waveform storage. With added memory, up to 40 waveforms can be stored for later recall. Multiple waveforms can be displayed on the CRT for instant comparison.

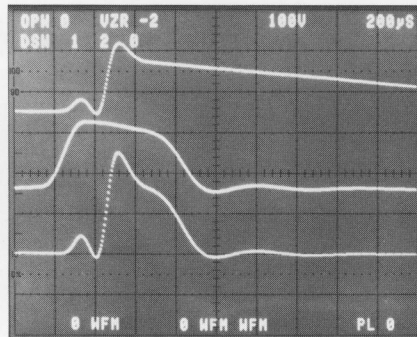
Pre-trigger with 7B87. Capture events that precede the trigger with the 7B87 Time Base plug-in. The amount of pre-trigger data can be varied from 0.2 to 9.9 divisions. Both pre-trigger and transient events can be stored at speeds of up to 50 μ s/div or up to 2 μ s/pt using an external clock.



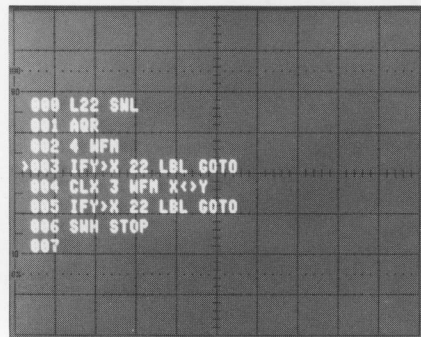
Conventional Scope: In the SCOPE mode, the 7854 provides a complete plug-in scope giving standard displays like other Tektronix high performance scopes.



Storage Scope: Risetime is calculated by pushing a single key. Time and voltage differences between cursors are shown on the line above risetime.



Multiple Storage and Calculation: Volts, current, and power are all shown on the display. Power calculation is a simple keystroke operation.



Waveform Processing: Keystroke Programming enables the user to design measurement routines tailored to individual tests or experiments.

Programmability. The 7854's keystroke functions, plus selection of the vertical and horizontal compartments, are programmable through its standard IEEE-488 (GPIB) interface. In addition, waveforms, constants, keystroke programs, and up to 12 lines of displayed text can be transmitted or received. Instructional text is especially useful for operator-interactive procedures.

Fast Bus Transfers. Because the 7854 can process waveform data, you can send answers over the GPIB instead of raw data. This saves transfer time, your controller's processing time, and your programming time.

Plug into a solid investment. The 7000 Series' plug-in design means that your scope will serve you as well tomorrow as it does today. Configure your scope to fit changing test requirements, choosing from a

wide range of amplifiers, counter/timers, sampling devices and other special-purpose modules. At any time, you can add new performance at a fraction of the cost of a monolithic instrument.

Instruction. Tek offers a 7854-based Waveform Processing Workshop that covers all 94 commands and operators available both locally and over the GPIB. You can explore the 7854 capabilities in this fast-paced, two-day course.

Application program library. 7854 users may take advantage of the Tektronix Instrumentation Software Library, a collection of utility software that assists users in designing measurement programs to fit their specific application needs.

SPECIFICATIONS

VERTICAL REAL TIME SYSTEM

Input — Two plug-in compartments; compatible with 7000 Series plug-ins.

Modes of Operation — LEFT, ALT, ADD, CHOP, RIGHT.

Mainframe Bandwidth — 400 MHz with 7A29 or 7A19 Amplifier plug-in.

Mainframe Step Response — 0.9 ns or less with 7A29 or 7A19 Amplifier plug-in.

Chopped Mode — Chop rate is ≈ 1 MHz.

Delay Line — Permits viewing leading edge of displayed waveform (7B50 Series time bases not recommended for 7854 except 7B50A).

Trace Separation Range — In dual-sweep modes, B trace can be positioned four div above or below the A trace.

CRT AND DISPLAY FEATURES

CRT Display Modes

SCOPE (Conventional display.)

STORED (Digital data display.)

BOTH (Stored display plus real time waveforms.)

PROGRAM ENTRY (User program text display.)

HORIZONTAL REAL TIME SYSTEM

Input — Two plug-in compartments; compatible with 7000 Series plug-ins. 7000 Series vertical amplifiers and specialized plug-ins may also be used.*

Modes of Operation — A, ALT, CHOP, B.

Fastest Calibrated Sweep Rate — 0.5 ns/div.

Chopped Mode — Rep rate is ≈ 200 kHz.

X-Y Mode — Phase shift between vertical and horizontal channels is within 2° from dc to 35 kHz without phase correction, (dc to 1 MHz with phase correction, B horizontal only, Option 02).

*Note: See plug-in compatibility for exceptions for digital storage.

PROGRAM STORAGE

Keystroke programming allows the mainframe to remember a sequence of keystrokes (with remote calculator keyboard or GPIB.*)

Editing — Line by line editing capability.

*Note: Mainframe vertical and horizontal modes and all other keys except edit commands are programmable.

DIGITAL STORAGE

Equivalent Time Bandwidth — 400 MHz. See 7000 Series system bandwidth specifications.

Accuracy — Refer to plug-in specifications.

Acquisition Channels — One or two simultaneous channels (Plug-in CHOP mode not valid).

Acquisition Window — ± 5 divisions from center screen both vertical and horizontal.

Resolution

Vertical — 0.01 div.

Horizontal — Selectable points/waveform on remote keyboard. Fixed at 512 points with Option 0D.

Horizontal Resolution (divs)	Points/Waveform
0.01	1024
0.02	512
0.04	256
0.08	128

PLUG-IN COMPATIBILITY

All 7000 Series plug-ins are compatible in the standard oscilloscope display mode. The 7L5 and 7L18 Spectrum Analyzers require factory modification for optimum use with digital storage operation. The 7D01, 7D02 and 7T11 are not compatible in STORED mode.

The 7B87 provides pretrigger for the 7854. Pretrigger allows you to view what has occurred before the trigger event in single shot applications. The amount of pre-trigger time is determined by the Acquire-Stop delay time setting. The total amount of pretrigger is 0.2 to 9.9 times the time/div setting.

Single Shot Performance — Using 7B87 with 7854 Internal clock.

Fastest Sweep (Time/Div)	Points/Waveform
50 μ s	128
100 μ s	256
200 μ s	512
500 μ s	1024

Ext Clock — 2 μ s/point maximum.

OUTPUTS/INPUTS

+Sawtooth — Positive-going with baseline at 0 V ± 1 V into 1 M Ω . Voltage is 1 V/div ($\pm 10\%$) into 1 M Ω , 50 mV/div ($\pm 15\%$) into 50 Ω . Output R is ≈ 950 Ω .

+Gate — Positive pulse of the same duration and coincident with sweep. Output voltage is 10 V ($\pm 10\%$) into 1 M Ω , 0.5 V ($\pm 10\%$) into 50 Ω .

Output R is ≈ 950 Ω . Source is selectable from A gate, B gate, or DELAYED gate.

Vertical Signal Out — Selected by A TRIGGER SOURCE switch. Output voltage is 0.5 V/div into 1 M Ω , 25 mV/div into 50 Ω . Output R is ≈ 950 Ω . Bandwidth depends upon vertical plug-in.

Remote Single Sweep Reset — Rear panel BNC, ground closure activated.

TTL Output — Rear panel BNC, TTL output under remote keyboard control (SWH and SWL).

External Z-Axis Input — 2 V p-p for full intensity range from dc to 1 MHz. Positive signal blanks the trace. Maximum input voltage is 15 V (dc plus peak ac).

Camera Power Output — Three-prong connector to the left of the CRT provides power, ground, and remote single-sweep reset access for the C-50 Series cameras.

Memory Back-Up Power Input — 6.0 V to 6.5 V at 0.7 amp to preserve stored data if mainframe's power is interrupted.

CALIBRATOR

Voltage Output — Squarewave, positive-going from ground. Ranges are 40 mV, 0.4 V, and 4 V into 100 k Ω ; 4 mV, 40 mV, and 0.4 V into 50 Ω . Amplitude accuracy is within 1%; rep rate is 1 kHz within 0.25%.

Current Output — 40 mA available through Calibrator output with optional BNC to current loop adaptor.

POWER REQUIREMENTS

Line Voltage Ranges — 90 V-132 V. 180 V-250 V.

Line Frequency — 48-440 Hz.

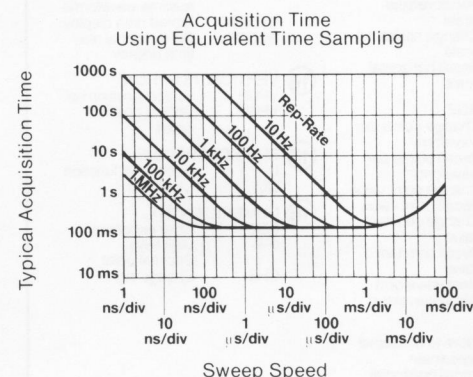
Maximum Power Consumption — 230 W.

INCLUDED ACCESSORIES

Power cord (161-0066-00); BNC-to-BNC cable (012-0208-00).

PHYSICAL CHARACTERISTICS

Dimensions, Mainframe	mm	in
Width	305	12.0
Height	348	13.7
Depth	627	24.7
Waveform Calculator	mm	in
Width	277	10.9
Height	69	2.7
Depth	165	6.5
Cord Length (within 76 mm)	1420	56.0
Weights	kg	lb
Net	20.4	45.0
Shipping	28.2	62.0



Note: 512 horizontal points, 7B87 at minimum holdoff.

MEMORY FORMAT

	STANDARD				OPTION 2D				OPTION 0D
Points Per Waveform*	128	256	512	1024	128	256	512	1024	512
Maximum No of Waveforms	16	8	4	2	40	20	10	5	1
Maximum No of Constant Registers	50				100				0
Maximum No of Prog Commands plus lines	920				2000				0

*Unless otherwise selected, default value is 512 at power-up.

IEEE STANDARD 488 INTERFACE

Standard — Conforms to IEEE Standard 488-1978.

Interface Functions Subset Implemented:

SH1	Complete Source Handshake
AH1	Complete Acceptor Handshake
T5	Talker Function
L3	Listener Function
SR1	Complete Service Request Capability
RL1	Complete Remote/Local Capability
DC1	Complete Device Clear Capability
DT1	Complete Device Trigger Capability

I/O Records — Waveforms, constants, program text, and display text.

End of Message Terminator (Selectable in TALK/LISTEN mode for EOI or LF/EOI). — Compatible with Tektronix and other popular controllers.

Device Address — Selectable via rear panel switch.

Remote Operation — All keystroke functions and vertical and horizontal modes can be remotely operated via the GPIB.

ORDERING INFORMATION (PLUG-INS NOT INCLUDED)

7854 Oscilloscope (including remote Waveform Calculator)

Option 02 — X-Y Phase Correction

Option 03 — EMC Modification

Option 78 — P11 Phosphor

Option 0D — Delete GPIB and remote Waveform Calculator one waveform storage

Option 2D — 4 k Expanded Memory, 040-0941-00

INTERNATIONAL POWER CORDS & PLUG OPTIONS

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

Option A2 — UK 240 V/13A, 50 Hz

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

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

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

7B87 Time Base required only for pretrigger and single shot digitizing

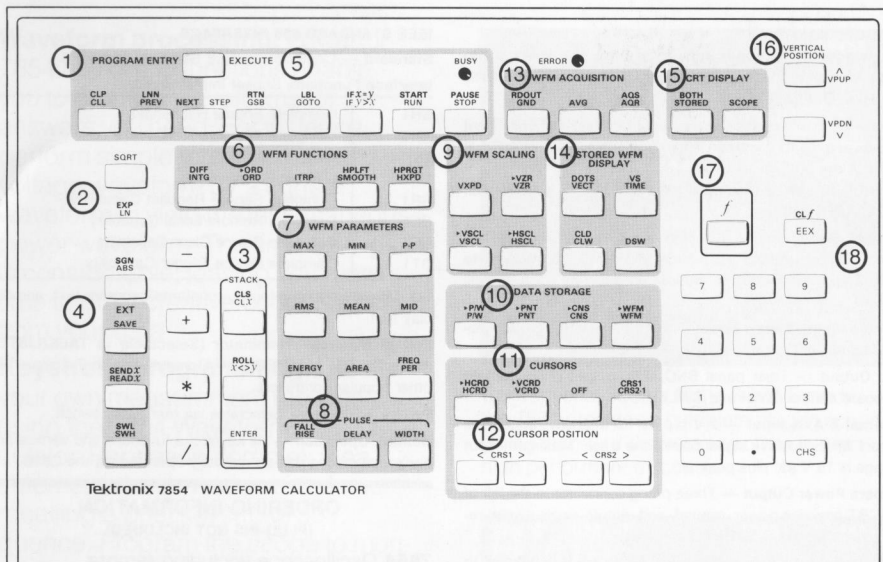
7854-based Waveform Processing Workshop — Covers all 94 commands and operators, which are available both locally and over the IEEE-488-1978 interface (GPIB). Through interactive lectures and labs, this fast-paced two-day course covers manipulation of data, keystroke mathematical operations and programming. (Availability subject to scheduling.)

7854 Service Technician Class — Tektronix offers service training classes that provide service personnel the knowledge and skills to support the 7854 to a component level. Contact your local Tektronix Sales Representative for further information.

Qualified service personnel electing to perform their own troubleshooting of the digital section of the 7854 will require the specific Tektronix equipment listed below. Additional equipment is specified in the Diagnostic Test Interface Service Manual. This equipment is not required for 7854 operation or understanding.

Diagnostic Test Interface	067-0911-00
Diagnostic Memory Board	067-0961-XX
MicroLab I Mainframe	067-0892-00
Signature Tables	070-2972-00

The 7854 is also available as a WP1310 Signal Processing System. This system is a combination of the Tektronix 7854 Oscilloscope and 4052A Graphic Computer. Together, these two instruments automate the waveform test and measurement process, from acquisition and calculation to storage and display formatting.



Description of 7845 Waveform Calculator Keys

- 1 PROGRAM ENTRY**
 PROG Switch to program entry mode
 CLP Deletes all program lines
 CLL Delete program line
 LNN Line label entry
 PREV Back up to previous line
 NEXT Advance to next line
 EXEC Return to execute mode
- 2 ARITHMETIC COMMANDS**
 SQRT Square Root
 EXP Exponential
 LN Natural log
 SGN Signum, either +1, 0, or -1
 ABS Absolute value
 - Subtract X from Y
 + Add X to Y
 * Multiply X by Y
 / Divide Y by X
- 3 STACK CONTROL**
 CLS Clear all stack registers
 CLX Clear X register by popping stack
 ROLL Circulate stack
 X<>Y Interchange X and Y
 ENTER Push stack
- 4 EXTERNAL COMMANDS**
 SAVE Transmit keystroke program
 SENDX Transmit waveform or constant
 READX Receive Waveform or constant
 SWL Set level to TTL low
 SWH Set level to TTL high
- 5 PROGRAM EXECUTE**
 STEP Executes a single line
 RTN Return from subroutine
 GSB Go to subroutine
 LBL Line label
 GOTO Unconditional jump
 IFX=Y Test if X is equal to Y
 IFY>X Test if Y is greater than X
 START Begins execution at line 000
 RUN Begins execution at next command
 PAUSE Wait about 0.7 seconds
 STOP Stop execution, transfer, or acquisition
- 6 WAVEFORM FUNCTIONS**
 DIFF Differentiate
 INTG Integrate
 >ORD Change ordinate
 ORD Recall ordinate
 ITRP Interpolate
 HPLFT Horizontally position left
 HPRGT Horizontally position right
 HXPD Horizontally expand
 SMOOTH Smooth
- 7 WAVEFORM PARAMETERS**
 MAX Maximum
 MIN Minimum
 P-P Peak-to-peak
 RMS Root mean square
 MEAN Average value
 MID Vertical midpoint
 ENERGY Energy
 AREA Area under curve
 FREQ Frequency
 PER Period
- 8 PULSE**
 FALL Fall time
 RISE Risettime
 DELAY Delay
 WIDTH Pulse width
- 9 WAVEFORM SCALING**
 VXP Vertically expand
 >VZR Change vertical zero
 VZR Recall vertical zero
 >VSCL Change vertical scale
 VSCL Recall vertical scale
 >HSCL Change horizontal scale
 HSCL Recall horizontal scale
- 10 DATA STORAGE**
 >P/W Change points per waveform
 P/W Recall points per waveform
 >PNT Change point value
 PNT Recall point value
 >CNS Change constant value
 CNS Recall constant value
 >WFM Store waveform
 WFM Recall waveform
- 11 CURSORS**
 >HCRD Move to horizontal coordinate
 HCRD Recall horizontal coordinate
 >VCRD Move to vertical coordinate
 VCRD Recall vertical coordinate
 OFF Turn off cursor(s)
 CRS1 Turn on one cursor
 CRS2-1 Turn on both cursors
- 12 CURSOR POSITION**
 CRS1< Move first cursor left
 CRS1> Move first cursor right
 CRS2< Move second cursor left
 CRS2> Move second cursor right
- 13 WAVEFORM ACQUISITION**
 RDOUT Acquire plug-in readout
 GND Acquire ground reference
 AVG Signal average
 AQS Acquire single-shot signals
 AQR Acquire repetitive signals
- 14 STORED WAVEFORM DISPLAY**
 DOTS Discrete dot display
 VECT Continuous vectored display
 VS Waveform versus waveform display
 TIME Waveform versus time display
 CLD Clear display of waveforms
 CLW Clear one waveform from display
 DSW Display waveform
- 15 CRT DISPLAY**
 BOTH Stored display plus realtime waveforms
 STORED Stored data display
 SCOPE Conventional real-time display
- 16 VERTICAL POSITION**
 VPUP Vertical position up
 VPDN Vertical position down
- 17 SHIFT COMMANDS**
 f Select shift function
 CLF Clear shift
- 18 NUMERIC ENTRY**
 EEX Enter exponent
 0-9 Digit keys
 CHS Decimal point
 Change sign


For further information, contact:

U.S.A., Asia, Australia, Central & South America, Japan
 Tektronix, Inc.
 P.O. Box 1700
 Beaverton, OR 97075
 For additional literature, or the address and phone number of the Tektronix Sales Office nearest you, contact:
 Phone: 800/547-1512
 Oregon only: 800/452-1877
 TWX: 910-467-8708
 TLX: 15-1754
 Cable: TEKTRONIX

Europe, Africa, Middle East
 Tektronix Europe B.V.
 European Headquarters
 Postbox 827
 1180 AV Amstelveen
 The Netherlands
 Phone: (20) 471146
 Telex: 18312-18328

Canada
 Tektronix Canada Inc.
 P.O. Box 6500
 Barrie, Ontario L4M 4V3
 Phone: 705/737-2700

Tektronix sales and service offices around the world:
 Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Denmark, East Africa, Ecuador, Egypt, El Salvador, Federal Republic of Germany, Finland, France, Greece, Hong Kong, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Japan, Jordan, Korea, Kuwait, Lebanon, Malaysia, Mexico, Morocco, The Netherlands, New Zealand, Norway, Pakistan, Panama, Peru, Philippines, Portugal, Republic of South Africa, Saudi Arabia, Singapore, Spain, Sri Lanka, Sudan, Surinam, Sweden, Switzerland, Syria, Taiwan, Thailand, Turkey, Tunisia, United Kingdom, Uruguay, Venezuela, Zambia, Zimbabwe.

Copyright © 1983, Tektronix, Inc. All rights reserved. Printed in U.S.A. Tektronix products are covered by U.S. and foreign patents, issued and pending. Information in this publication supersedes that in all previously published material. Specification and price change privileges reserved. TEKTRONIX, TEK, SCOPE-MOBILE, TELEQUIPMENT and  are registered trademarks. For further information contact Tektronix, Inc. P.O. Box 500, Beaverton, OR 97077. Phone (503) 644-0161, TWX 910-467-8708. Cable: TEKTRONIX. Subsidiaries and distributors worldwide.

Tektronix®
 COMMITTED TO EXCELLENCE