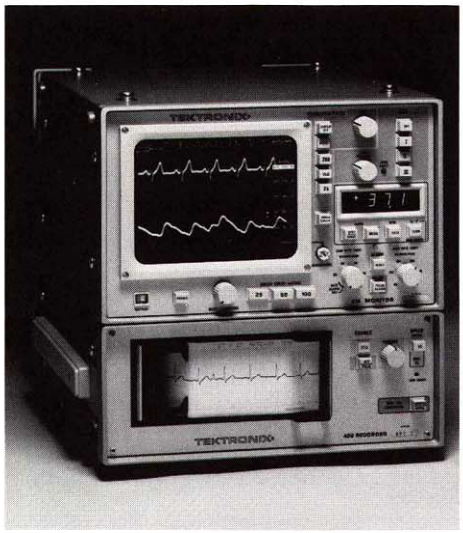
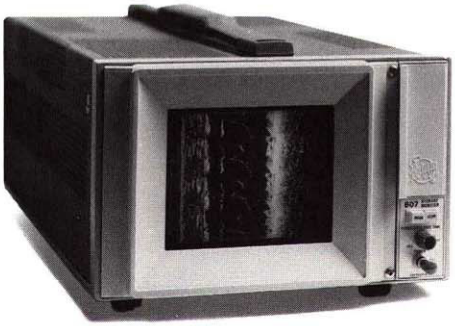
MEDICAL MONITOR PRODUCTS



Companion Hardcopy Units for Portable Patient Monitors

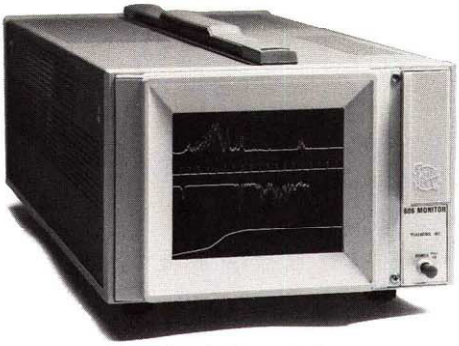
These six-pound, 400-Series Recorders attach directly to TEKTRONIX 408, 412 and 414 Portable Patient Monitors and provide thermal printout records of ECG, blood pressure, or peripheral pulse waveforms. Options for analog only, or analog and alphanumeric printout of monitor data are available. See page 215.

DISPLAY MONITORS



50 Minute Gray Scale Storage Display Monitor

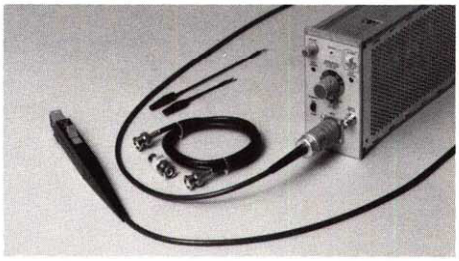
The TEKTRONIX 607 Variable Persistence Storage Display Monitor produces detailed images that may be stored up to 50 minutes, with less deterioration than any other similar monitor. Display persistence is adjustable to allow the image to fade at a rate consistent with the event being monitored. The TEKTRONIX 607 writes at 0.8 div/μs; X- and Y-axis bandwidth is 3 MHz and Z-axis bandwidth is 5 MHz. It features excellent gray scale capability and a 20-mil (.51 mm) stored, and 12-mil (.30 mm) nonstored spot size, measured by the shrinking raster method. Differential inputs are standard; erase, non-store, and save-storage functions may be programmed remotely at TTL logic levels. The 607 may be ordered with a time base option that adds amplitude-versus-time measurement capability. See page 220.



Very High Resolution Display Monitor

An excellent choice for crisp photographs and well-defined displays, the new TEKTRONIX 606 Display Monitor has 5-mil (.13 mm) spot size (measured by the shrinking raster method) and light output is uniform over the entire crt. The linear Z-axis amplifier with 10 MHz bandwidth, allows the many shades of gray necessary for an accurate image. The high resolution of the 606 is most useful in applications such as scanning Auger and electron microscopes, ultrasound systems and gamma camera systems. See page 221.

ACCESSORIES, SCOPE CARTS



The P6302/AM 503 Current Probe System provides current measurement capability ranging from 1 mA to 20 A (50 A Peak) and can be extended to 20 mA to 5000 A/div (50,000 A Peak) with the addition of the CT-5 Current Probe.

Consisting of a P6302 Current Probe, an AM 503 Current Probe amplifier, any TM 500 Power Module and an oscilloscope, the P6302/AM 503 is especially useful when low loading is critical, such as with high impedance points or current dependent devices.

The P6302 operates with no electrical contact (inductive coupling). The probe is easy to use; just open the sliding jaw and place it around the conductor, no need to break the circuit. The probe can also be used to measure the sums or differences of currents in separate wires.

The AM 503 is calibrated in 12 steps and the knob skirt is illuminated to indicate current per division. Bandwidth may be limited to 5 MHz to eliminate unwanted transients.

Any oscilloscope with at least 75 MHz bandwidth and 10 mV sensitivity will display the 50 MHz capability of the P6302/AM 503. The AM 503 output may be terminated with a supplied 50 Ω termination or plugged directly into a 50 Ω oscilloscope amplifier. See page 164.

The TEK Rack Cart Model 7 is a new versatile and rugged equipment cart designed to accommodate standard 19-inch rackmounted systems.

Computers, small systems or test centers assembled into this mobile test system may be mounted to the front or rear of the Model 7. For added versatility, the adjustable rails allow equipment of varying depths to be mounted.

Constructed of aluminum, the Rack Cart Model 7 is designed to be shipped with up to 300 pounds of equipment mounted in place and is UL listed. See page 256.

Modular Probes

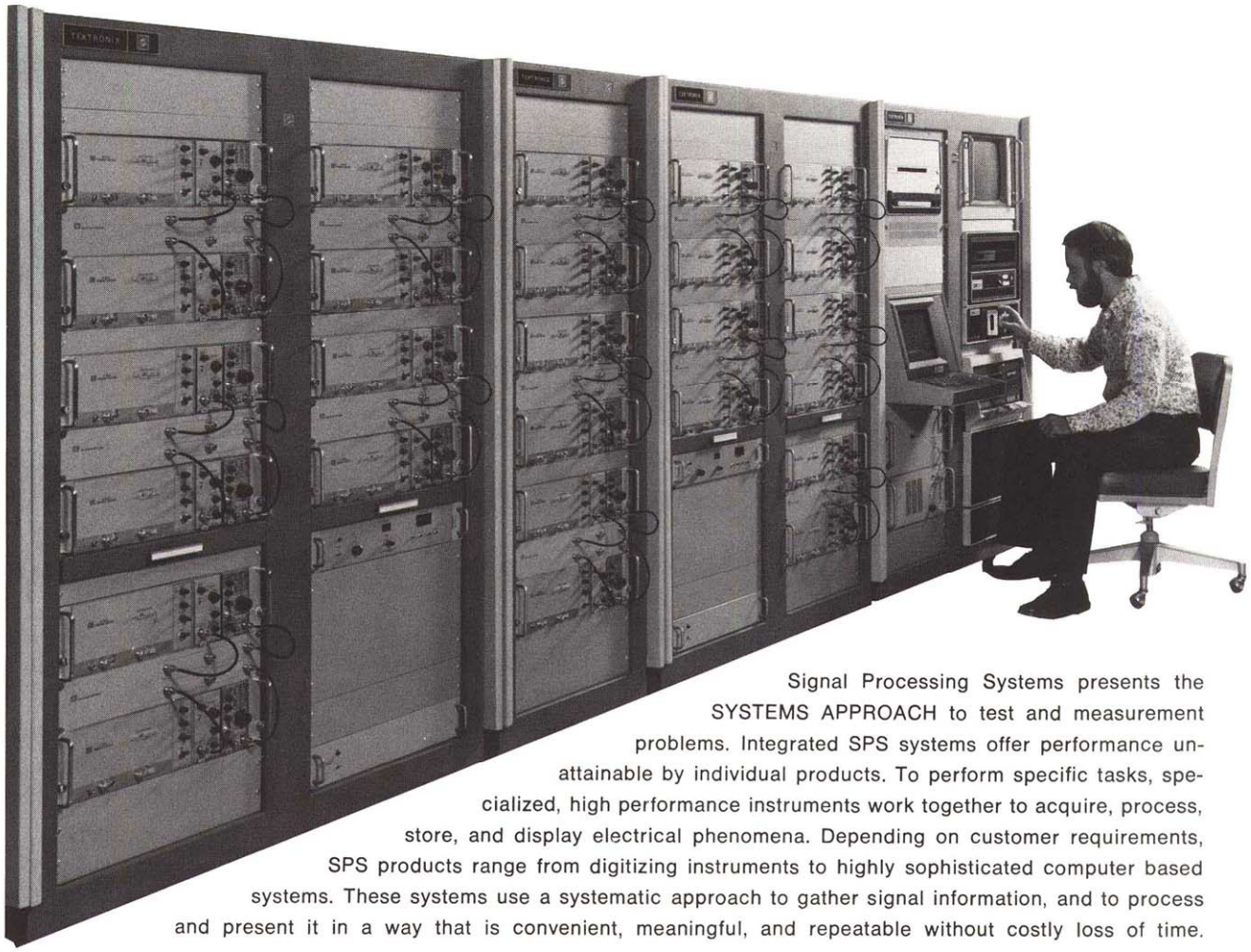
Modular probes are an exciting new concept in probe design. The P6101, P6105, P6106, P6108, and P6149 Probes divide into three modules (probe heads, cables, and connector/compensation boxes). The modules snap together making maintenance and repair less expensive, faster, and much easier. Snap-on replacement modules eliminate soldering irons and tools, and modular probes do not have to be sent in to be repaired because spare modules can be ordered and stocked. Strain relief and modular component design make these probes rugged for greater reliability.

The P6101, P6105, P6106, and P6108 are available in three color-coded lengths—blue for one meter, yellow for two meters, and red for three meters. (The P6149 is two meters long.) These probes may be used to acquire high fidelity signals from low source-impedance circuits.

TEKTRONIX Modular Probes are designed for specific TEKTRONIX Instruments, but may be purchased as options for all TEKTRONIX Oscilloscopes with 1 MΩ and appropriate pF inputs as indicated in the chart on page 235. The P6106 is standard with the 475A and 475 oscilloscopes.

The P6149 features a right angle BNC connector. This can be useful when bench space is limited. See page 246.

Signal Processing Systems
and Digitizing Instruments

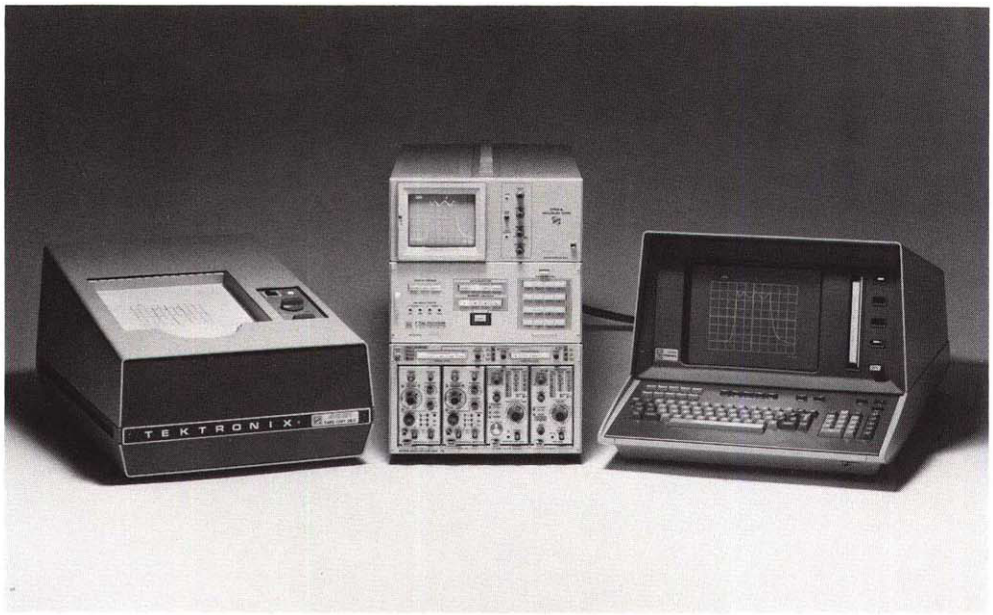


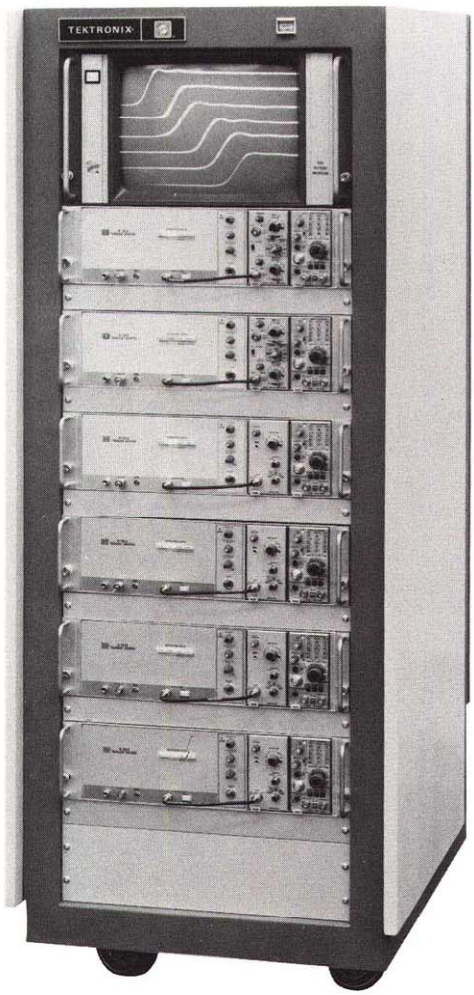
Signal Processing Systems presents the SYSTEMS APPROACH to test and measurement problems. Integrated SPS systems offer performance unattainable by individual products. To perform specific tasks, specialized, high performance instruments work together to acquire, process, store, and display electrical phenomena. Depending on customer requirements, SPS products range from digitizing instruments to highly sophisticated computer based systems. These systems use a systematic approach to gather signal information, and to process and present it in a way that is convenient, meaningful, and repeatable without costly loss of time.

Today's measurements have become so sophisticated that users and buyers of test and measurement products are now asking such questions as, how accurate is accurate? What is the trade off between speed of acquisition and quality of measurement? How much time does it really take to make a real-time analysis? How can you obtain the high accuracy provided by digital instruments while maintaining the interpretive benefit of analog systems?

The Signal Processing Systems group has addressed themselves to just such questions; and by combining analog and digital capabilities systematically, has provided the sophisticated information and performance technologists are demanding today.

To better explain the SPS approach, we begin with digitizing. Digitizing is the process of transforming analog information into a numerical format that the computer, our modern day workhorse, can quickly digest and put to work for us.





The WP2052 CAMAC Compatible WDI configuration is one of a series of SPS products designed for labs that use the CAMAC interface standard, IEEE 538.

Digitizing is not just a tool of the space scientist. We see it work for us everywhere — in our electronic instruments, our industrial machines, our home appliances, our cars. It's a big part of today's technology, a powerful answer to today's and tomorrow's measurement problems. And when you combine digitizing capability with a signal acquisition device and a controller, you have a signal processing system that can acquire, process, store, and display at speeds and levels of complexity never before possible.

Tektronix Signal Processing Systems group offers a number of different types of signal processing systems including waveform digitizing instruments (WDI) and digital processing oscilloscopes (DPO).

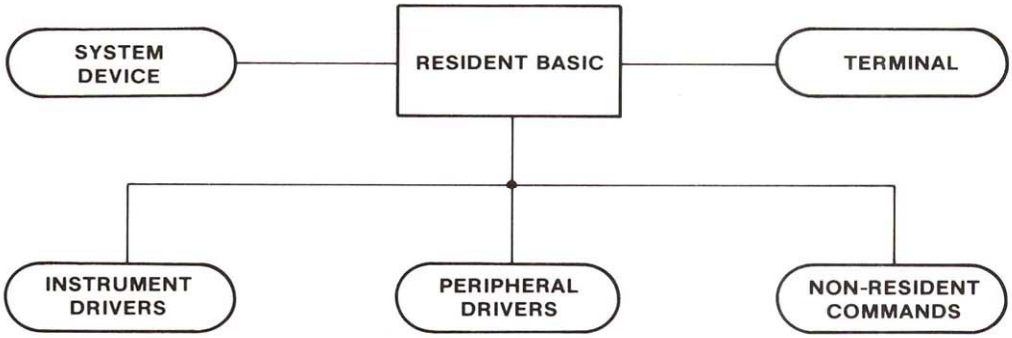
To advance technology in numerous disciplines such as physics, chemistry, and electronics, researchers have learned to use a variety of instruments to solve measurement problems. The acquisition of fast transient events is one problem, common to these fields, that has been extremely difficult to solve. The problem is compounded when, in addition to being observed, an event must be analyzed. WDI configurations have been designed to quickly and economically give users the information they need by capturing and processing both transients and repetitive short duration events.

Where masses of analog data must be reduced for analysis, the oscilloscope helps by acquiring and displaying signals to be photographed. Analysis requires a calculator or computer to process the data. However, the analog data must be digitized first, and the digitizing process is long and complex, especially if done by reading coordinates from a waveform photograph.

A better method is to use an oscilloscope and digitize the analog information directly, then process it, and display it in whatever format the user finds best. To accomplish this, Tektronix offers Digital Processing Oscilloscopes, intelligent instruments that provide a flexible two-way link between the analog world of the laboratory oscilloscope and the digital world of machine intelligence.

An important aspect of SPS products is the software. A complete solution of problems associated with waveform acquisition and analysis requires a commitment to both advanced hardware and comprehensive software.

TEK™ SPS BASIC Software is a new generation of instrument control for Signal Processing Systems. It retains many of the standard features of the original Dartmouth BASIC, but includes new features and concepts to make instrument control and waveform processing fast and simple. Capabilities include array and waveform arithmetic operations and functions, character string processing, program text editing, and file manipulations.



Block diagram of TEK SPS BASIC structure. Resident BASIC, including the system device and terminal drivers, is the only software permanently resident in the computer. Everything else is modularized, reserving the maximum amount of memory for programs and data. The loadable modules are divided into three categories. Instrument drivers communicate with data gathering equipment either directly or through a General Purpose Interface Bus. The peripheral drivers handle such devices as disks, papertape, and line printers. The non-resident commands include both standard BASIC commands and special modules for routines such as Fourier transforms, graphics, and user-written routines.

Easy to Program

TEK SPS BASIC is interactive. Programming via the graphics terminal enables users, even those without formal computer programming experience, to quickly develop measurement and analysis routines. To assist operators, system commands are provided to edit, store, and retrieve programs easily. In addition, TEK SPS BASIC responds with an error message on the terminal when statements are entered incorrectly.

A key feature in TEK SPS BASIC is modularity. Like oscilloscope plug-ins, modularity allows you to select only those features necessary for a particular job, keeping the greatest amount of computer memory free for data. Drivers (routines that communicate with instruments and peripherals), special BASIC commands, and waveform analysis packages (like Fast Fourier Transforms, Correlations, etc.) are loaded into memory only when needed.

This ability allows you to customize your operating environment to best fit your needs.

Special Functions

Since waveform processing for analysis often requires a knowledge of mean, minimum, maximum, and rms values, TEK SPS BASIC contains functions for determining those values, and also contains single-word commands for *integrate (INT)* and *differentiate (DIF)*. These functions save a great deal of programming time. There is also a special function, *cross (CRS)*, that can be used for determining the point at which array values cross a specified level.

Fast Fourier Transform

Analysis of waveforms and transients often includes determining the frequency components of acquired time domain data. This can be accomplished with the fast Fourier transform. The inverse Fourier transform is also provided to reconstruct time domain information from frequency domain data. In TEK SPS BASIC, these are simple commands, *FFT* and *IFT*, that do not require tedious programming. Both can be executed by single-word commands, or incorporated easily into longer user programs.

Transfer Function Analysis

A transfer function mathematically describes the response characteristics of a circuit or a system. By measuring and analyzing both the input and output signals, one can develop the signal transfer characteristics of a circuit or system under test. When continuous wave techniques are inappropriate, the transient analysis capabilities of our WDI configurations are required. This is often the case in "real life" environments, and it is in these cases that the SPS WDI waveform analysis systems are most useful. TEK SPS BASIC allows the user to write his own transfer function algorithms. While the transfer function analysis is a complex measurement to perform, it is probably one of the most useful measurement tools available to the experimenter today.

Signals and Noise

Software techniques useful for viewing signals in the presence of noise include signal averaging and correlation. For repetitive signals, averaging can be used to remove uncorrelated noise. In other applications, such as locating an echo following a stimulus pulse (echo ranging with lidar, radar, and sonar), cross correlation can be used. Auto correlation is also provided, and can be used to detect extremely weak signals accompanied by noise, or to detect the presence of unknown periodic signals interspersed among seemingly nonperiodic signals.

Software Digital Filtering

When it is required that a signal be filtered, and it is prohibitively expensive, or not practical to build the desired filters from electronic components, digital filtering often provides a solution. The ability of TEK SPS BASIC to simulate desired circuit effects, through operations such as integration, Fourier transform, etc., enables users to synthesize the required filter.

Storage medium options include: 1) dual tape cassette drives, 2) cartridge disk drives and 3) dual floppy disk drives. (Dual floppy disk drives are components of standard systems; dual tape cassette drives and cartridge disk drives are available through special arrangement.).

Instrumentation Unmatched for Signal Acquisition and Analysis Wide-Band Digitizing Scope.

TEKTRONIX 7704A with crt readout and the P7001 Digitizer/Buffer.

Signal Acquisition Flexibility

DPO's use a wide variety of TEKTRONIX 7000-Series Oscilloscope plug-in amplifier and time bases.

Versatile Data Processing Controllers

TEKTRONIX Controllers with memory capacities of 24k or 28k.

Convenient Records

Data and programs can be easily stored on paper tape or magnetic disk and diskettes.

Easily Expandable

With various memory capacities available, and the ability to use TEKTRONIX Hard Copy Units, Dual Drive Magnetic Cassette Units, flexible disk drives, and dozens of 7000-Series signal acquisition plug-ins, DPO capabilities are almost unlimited.

The complete solution of problems associated with waveform acquisition and analysis requires a commitment to both advanced hardware and comprehensive software. At Tektronix, the WP1200-Series Digital Processing Oscilloscopes have resulted from this commitment.

Extensive signal acquisition capabilities of DPO's are made possible by use of instrumentation from the TEKTRONIX 7000-Series Oscilloscope family. The crt display and signal acquisition portions of DPO's are from the 7704A laboratory oscilloscope mainframe.

Also, the modular signal acquisition plug-in concept used in the 7000-Series has been retained. Today, acquisition capabilities are unexcelled. Users have the widest available selection of signal conditioning plug-in amplifiers, time bases, spectrum analyzers, counters, multimeters, and samplers.

In the future, as new technology increases the number and variety of 7000-Series plug-ins, users will be assured of continued DPO analysis applications.

DPO SPECIFICATIONS

Data Acquisition — Any repetitive signal that can be displayed as a waveform on the crt can be stored in the processor memory along with corresponding scale factors.

Deflection Factor — See the vertical system plug-in specifications in the TEKTRONIX 7000-Series catalog.

Data Acquisition Time — 6.5 μs per data point.

Number of Data Points — 512 per waveform (max).

Resolution — 10 bits (1 part in 1024).

DIGITIZER/BUFFER

The internal DPO memory is capable of storing four digitized waveforms, with scale factors, and twelve messages. The source of waveform information may be the plug-ins or an external device (CPU). Messages into the message area of memory originate from the external device.

Cycle Time — Less than 1.5 μs.

Allocation — The four waveforms (512 points/waveform, 2048 data points) and scale factors (80 characters/waveform, 320 characters) are allocated to memory locations A, B, C, and D.

Space is also allocated to store 12 messages (80 characters/message, 960 characters).

Message Capability — Stores up to 12 different messages* with 80 characters each, in 2 rows of 40 characters each. The messages are displayed across the top and bottom of the crt.

Character Set — Full upper case ASCII alphabet and SPACE; numerals 0 through 9; decimal point; and the following characters: +, −, <, >, /.

Four Data Handling Modes — STORE: the waveform analog information is converted to digital data and stored in memory. The process is continuous until the memory is filled or terminated. HOLD: the continuous store operation terminates and sets the P7001 in a safe mode. SEND: directs an external device (CPU) to transfer data from memory. RECEIVE: directs an external device (CPU) to transfer data into memory. Waveforms from memory provide a flicker-free display.

Program Call — Sixteen buttons provide front panel access to 13 specific software programs and an indication when the external device (CPU) is processing a program.

DISPLAY

Source — Selects one of three modes: 1) PLUG-IN, information that can be stored in memory; 2) MEMORY, information already stored in memory; or 3) BOTH, timeshares the display between memory and plug-ins.

Display Characteristics of Stored Waveforms from Processor Memory —

Resolution: 10 bits vertical, 9 bits horizontal.

Accuracy: Within 1.5% (8-div reference).

Linearity: 0.1 division or less compression or expansion of a center-screen two-division signal, when positioned anywhere within the graticule area.

Modes: Dot (display of data points) and vector (linear interpolation between adjacent points).

A front panel adjustment allows the operator to position the memory display on a graticule reference line.

Comparison of Stored Waveform to Realtime Waveform — Gain is within 1% of realtime waveform. A front panel adjustment positions the plug-in display so that it is coincident with the stored waveform display.

PROGRAMMABLE FUNCTIONS

A remote external device (CPU) can program the data handling modes, memory location, and display source of the Processor. It can also interrogate the status of the Processor data handling, memory location, and program call push buttons.

Messages are stored in the P7001 memory under control of an external device (CPU) through the I/O interface.

Sub-nanosecond Storage Oscilloscope

Bright Stored Display of a Transient or Repetitive Waveform

High Performance

- 500 MHz @ 10 mV/div
- 1 GHz @ 4 V/div
- To 0.5 ns/div sweep speeds
- 8,000 div/μs digitized writing speed
- 30,000 div/μs stored writing speed

7000-Series Compatible

Before sub-nanosecond transients can be studied in detail, they must be captured. The R7912 Transient Digitizing Instrument configurations have been designed specifically for these high speed signals. It combines efficiency, accuracy, and flexibility into an easy-to-operate system that enables you to easily view fast transients.

Researchers in many fields, including those involved in the study of laser pulses, superfast electro-chemical measurements, fluorescence decay, non-destructive device testing, EMP, and ECM, will find the WP 2000's capability to display single events with subnanosecond rise times unmatched by conventional instrumentation.

The WP 2000-Series WDI analysis configurations are designed to acquire waveforms of transient phenomena and immediately perform full analyses. Other WDI analysis configurations include from 1 to 32 R7912 acquisition units, a controller (for waveform processing), a graphics terminal, a tv video or display monitor, a disk or diskette, and TEK SPS BASIC software.

PERFORMANCE CHARACTERISTICS

OUTPUTS

Signal Outputs — Plus Gate; Output voltage: 0.5 V (±10%) into 50 Ω or 10 V (±10%) into 1 MΩ. Rise Time: 2 ns or less into 50 Ω. Output Resistance: 950 Ω ±2%.

Fast Rise Calibrator Waveshape — Positive-going square wave with baseline approximately at ground. Duty cycle: approximately 50%. Amplitude Accuracy: open circuit (4 V, 400 mV) ±0.5% from 0°C to +40°C; 50 Ω (400 mV, 40 mV) ±1.0% from 0°C to +40°C. Frequency; internally selectable, 1 MHz ±0.1%, 1 kHz ±20%. Rise Time: 1.2 ns or less at 400 mV, or 40 mV into 50 Ω.

Video Outputs — Conform to EIA RS-170 (525/60). Video Linear: 1 V into 75 Ω per full white signal. Video Binary: either low-level 0 V to ±0.3 V max, or high-level ±1.0 V ±0.1 V into 75 Ω. Video Composite: binary video plus sync, 1 V p-p nominal. Sync Out: at least 4 V into 75 Ω. Sync in (Loop Through): 2 V to 8 V, 75 Ω.

Data Outputs — 12 data lines out. All are TTL levels.

VERTICAL SYSTEM

Channels — Left-hand plug-in compartment; compatible with 7000-Series plug-ins. Bandwidth (up to 1 GHz) determined by mainframe and plug-in unit.

Chopped Mode — Chop rate determined by vertical plug-in selected.

Delay Line — Permits viewing leading edge of displayed waveform.

HORIZONTAL SYSTEM

Channels — Right-hand plug-in compartment; compatible with time bases of 7B80 and 7B90 Series.

Fastest Calibrated Sweep Speed — 500 ps/div with 7B92.

SCAN CONVERTER CRT

Type — Double-ended dual-gun crt.

Resolution — DIGITAL mode: binary, 512 point matrix; resolution elements, 320 vertically by 400 horizontally. NON-STORE mode: at least 400 tv lines per picture width at 50% response.

Writing Rate (+10°C to +40°C)* — NON-STORE mode: visual writing rate 30,000 div/μs when viewed on TEKTRONIX 632 Picture Monitor. DIGITAL mode: 8,000 div/μs digital storage writing rate.

**(0°C to +10°C) at least one half of the +10°C to +40°C values.*

MEMORY OPTION

Type — Static semiconductor memory, non-destructive readout.

Size — 4096 words by 10 bits.

Cycle Time — 1.6 μs per word or slower.

Output — Bits: parallel; word: serial; 9 data bits plus 10th-bit flag.

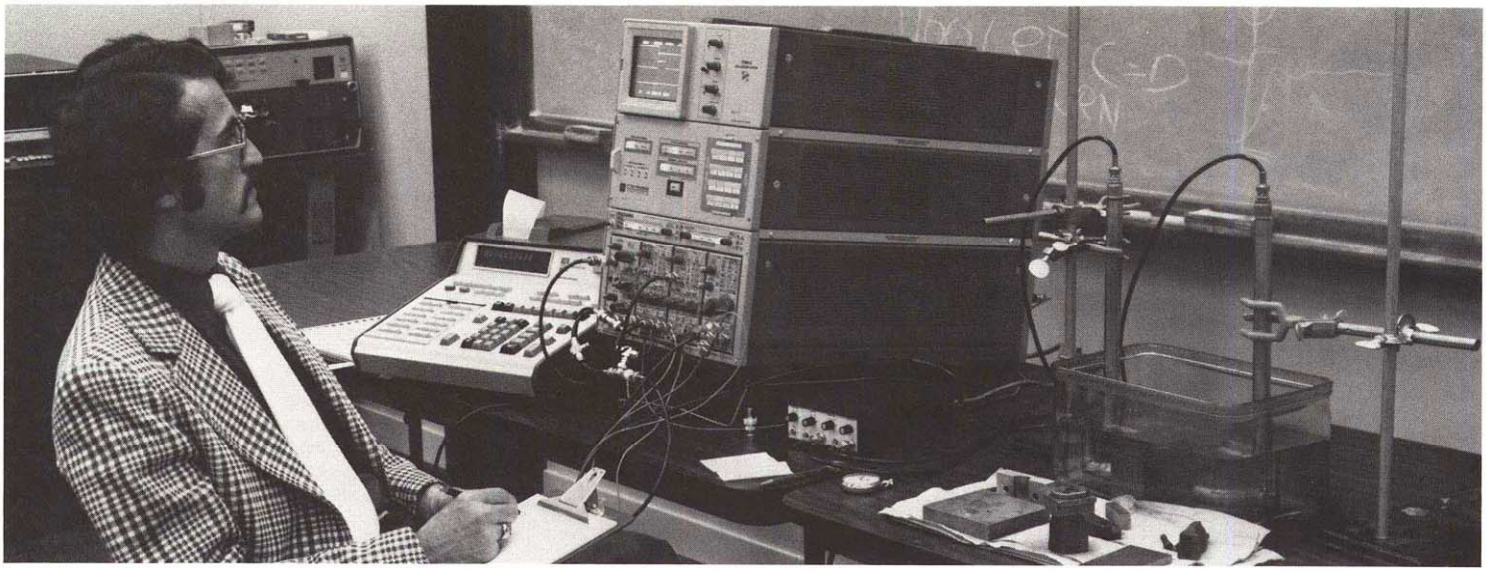
ELECTRONIC GRATICULE

Modes — Triggered at end of sweep or controlled via data-connector.

Display — 8 x 10 major divisions consisting of a dot matrix. Selectable—5 dots/div or 1 dot/div.

Intensity — Adjusted or disabled from front panel.

Stability — ±0.1% from +20°C to +30°C, ±0.5% from 0°C to +20°C and +30°C to +40°C.



Due to the truly versatile nature of TEK Signal Processing Systems, their applications are diverse. Some of these applications include the following.

Non-destructive testing of nodular iron cast components.
A digital solution that combines high-resolution ultrasonic testing with process control. It makes the measurement automatically, analyzes the data, reaches a go/no-go decision, and activates the correct assembly line controls.

Laser induced fusion research. Oscillator pulse purity may be checked by using either fiber optics and a photo diode, or a pellicle at the output of the laser to obtain pulse information for analysis. Similar techniques may be used to check the purity of pulses at several stages.

The power levels of these laser pulses may be measured by integrating each detector output waveform, with the area under the curve representing the pulse power. Other detectors that provide suitable outputs for the SPS configurations include Faraday cups, cylindrical analyzers, and secondary electron multipliers.

Dynamic laser trimming of active circuits, or devices, by applying power from the laser to do a cutting sequence that will bring the circuit closer to a specified performance level. SPS instrumentation may be used to monitor the circuit single-shot response characteristics and thus avoid circuit thermal effects.

Materials testing in industry. SPS instrumentation monitors lasers used in shock hardening materials as well as the effect of the laser energy on the material itself.

Time of flight (TOF) mass spectrometry. TOF mass spectrometry, materials are heated to cause emission of ions. These ions are accelerated, focused into an ion beam, and detected in a TOF tube. The mass-to-charge ratio (m/e) of each ion type determines its velocity in the TOF tube. Ion species identification is accomplished as a function of time, since each species in the sample travels at a different velocity and arrives at the detector at a different time. With the time data, the m/e may be calculated and each species identified.

The list of SPS applications is growing, and includes:

Aviation and Aerospace — Automatic Test Equipment.

Communications — Transfer function analysis.

Component Testing — IC parameters, pc boards, filters.

Electronic Warfare — ECM, radar signature analysis.

Laser Interferometry — Doppler shift effect of laser beams.

Meteorology — Cloud pollution content studies using radar and pulsed lasers.

Navigational Systems — Pulse code modulation (pcm), timing information.

Nuclear Magnetic Resonance — Observing flip resonance.

Optics — Determining laser related optical characteristics.

Power Lines — Transient monitoring and analysis.

Power Supply Design — Switching transient analysis.

Raman Scattering — Laser backscatter and frequency shift control and analysis.

Security Systems — Transfer function analysis.

Application Notes

A library of Application Notes is maintained to disseminate technical information about the uses of SPS instrumentation. This library contains notes on specific techniques used in operating SPS instrumentation as well as descriptions of market oriented instrument applications. A sample of notes presently available includes:

DPO Program Library Techniques
(DPO Note 45F1.0)

Mechanical Measurements Using the DPO
(DPO Note 45A1.0)

Engine Performance Measurements
(DPO Note 45A1.1)

R7912 Transient Digitizer . . . A Solution to Pulse Laser Measurement Problems
(WDI Note 47N1.0)

Pulsed Laser Measurements Using the R7912 Transient Digitizer.
(WDI Note 47N1.1)

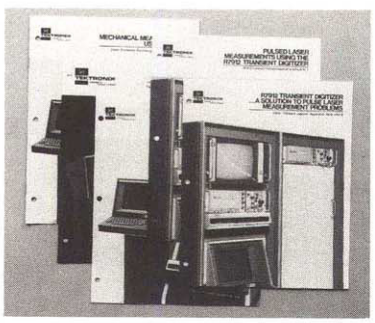
Real-Time Metals Analysis Using the DPO
(DPO Note 45N1.0)

Windowing to Control FFT Leakage
(SPS Note 47L1.0)

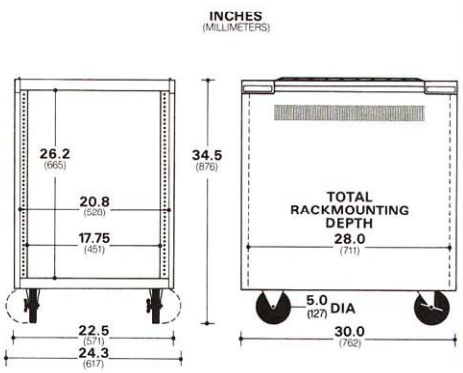
"Measuring Transistor Switching Times with the DPO"
(DPO App Note 45K1.1)

"TDR Difference Testing with TEK Signal Processing Systems"
(Signal Processing Systems App Note 47I1.1)

"Automatic Measurement of Nodular Iron Cast Parts"
(DPO App Note 45C1.1)



SCOPE-MOBILE® Carts



TEK RACK CART MODEL 7

Recommended For:

Rackmounted systems and instruments.

MODEL 7 allows mounting of equipment to front or rear of cart. Adjustable rails for slide mounted equipment are provided. The Model 7 is designed and UL listed for up to 300 lbs mounted in place. It has removable side panels and a light grey vinyl finish. Several rackmount accessories are available such as blank panels, etc. A brochure describing the Model 7 and accessories is available from your local Tektronix Field Office Representative, or Distributor.

Net Weight 60 lbs, shipping weight 77 lbs.

Order Model 7 . . . . . **$450**

Optional Accessories

Stabilizer

Required to meet UL specifications for slide mounted equipment.

Order 016-0318-00 . . . . . **$85**

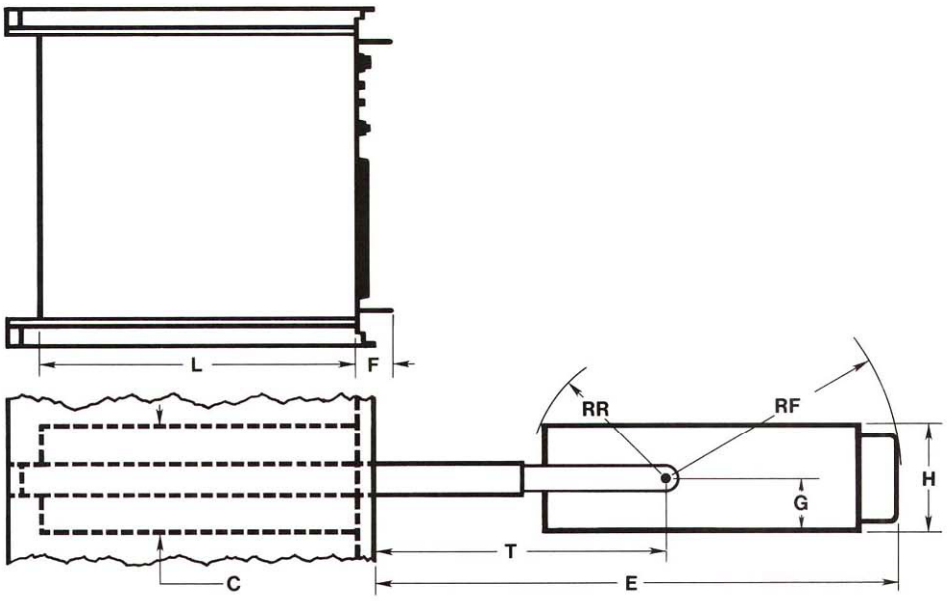
Safety Belt

To secure instruments to top surface of cart.

Order 346-0136-01 42 in **$15**

Order 346-0156-01 57 in **$15**

Rackmount Instrument Dimensions



DIMENSIONS EXCLUSIVE OF PLUG-IN UNITS AND PROBES

Symbol	Description	Definition
H	Height	Height of front panel.
L	Length	Rack front to rearmost permanent fixture excluding cables.
F	Forward Clearance	Back of front panel to foremost protrusion.
G	Vertical Axis	Bottom of front panel to horizontal plane of rotation.
E	Extended Inst	Maximum forward clearance with instrument out and horizontal.
RF	Radius — Front	Front radius of rotation.
RR	Radius — rear	Rear radius of rotation.
T	Track	Rack front to pivot point.
C	Cabinet	Cabinet height.

MOUNTING DIMENSIONS

PRODUCT	H		L		F		G		E		RF		RR		T		C	
	in	cm	in	cm	in	cm	in	cm	in	cm	in	cm	in	cm	in	cm	in	cm
R434	5.3	13.5	18.0	45.7	1.6	4.0	—	—	—	—	—	—	—	—	—	—	5.3	13.5
R465*, R475*, R475A*	7.0	17.8	16.3	41.4	1.8	4.6	3.5	8.9	20.4	51.8	11.0	27.9	7.9	20.1	9.6	24.4	6.8	17.3
R485*	7.0	17.8	16.2	41.1	1.8	4.6	3.5	8.9	19.3	49.0	10.9	27.7	7.9	20.1	9.3	23.6	6.8	17.3
R491*	7.0	17.8	17.4	44.2	2.1	5.1	3.5	8.9	21.1	53.6	11.9	30.2	8.5	21.6	9.3	23.6	6.8	17.3
R5100N*, R5400*	5.3	13.5	19.0	48.3	1.1	2.8	1.8	4.6	24.6	62.5	—	—	—	—	—	—	5.3	13.5
R7704*	7.0	17.8	22.4	56.9	2.3	5.8	1.8	4.6	33.3	84.6	15.3	38.9	10.7	27.2	18.5	47.0	7.0	17.8
R7313*, R7603*, R7613*, R7623*	5.3	13.5	22.3	56.6	2.0	5.1	—	—	25.2	64.0	—	—	—	—	—	—	5.3	13.5
R7844*	7.0	17.8	24.8	56.6	2.3	5.8	1.75	4.4	—	—	—	—	—	—	—	—	7.0	17.8
R7903*	5.3	13.5	22.5	57.2	2.3	5.8	—	—	25.3	64.3	—	—	—	—	—	—	5.3	13.5
R7912*	5.3	13.5	26.9	68.3	1.8	4.6	—	—	26.9	68.3	—	—	—	—	—	—	5.3	13.5
RTM506	5.25	13.3	18.9	48.0	1.82	4.7	—	—	—	—	—	—	—	—	—	—	5.25	13.3
T922R *	5.2	13.2	17.0	43.2	1.7	4.3	—	—	24.2	61.5	—	—	—	—	—	—	5.2	13.2
016-0115-02	5.3	13.5	16.3	41.4	0.3	0.8	—	—	—	—	—	—	—	—	—	—	5.3	13.5
016-0268-00	5.3	13.5	19.8	50.3	1.8	4.6	—	—	—	—	—	—	—	—	—	—	5.2	13.2
040-0551-00	14.0	35.6	22.4	56.9	0.6	1.5	—	—	30.9	78.5	—	—	—	—	—	—	—	—
040-0554-00	15.8	40.1	21.5	54.6	1.9	4.8	—	—	31.3	79.5	—	—	—	—	—	—	—	—
040-0600-00	5.25	13.3	18.3	46.5	0.7	1.8	—	—	—	—	—	—	—	—	—	—	5.25	13.3
040-0601-00	5.25	13.3	18.3	46.5	0.7	1.8	—	—	—	—	—	—	—	—	—	—	5.25	13.3
040-0616-00	5.3	13.5	16.5	41.9	1.1	2.8	1.8	4.6	24.6	62.5	—	—	—	—	—	—	5.3	13.5
040-0617-00	5.3	13.5	16.5	41.9	1.1	2.8	1.8	4.6	24.6	62.5	—	—	—	—	—	—	5.3	13.5
040-0624-00	5.25	13.3	18.3	46.5	0.7	1.8	—	—	—	—	—	—	—	—	—	—	5.25	13.3
437-0031-00	8.8	22.4	9.5	24.1	0.3	0.8	—	—	—	—	—	—	—	—	—	—	7.1	18.0
437-0071-00	7.0	17.8	13.4	34.0	1.4	3.6	—	—	—	—	—	—	—	—	—	—	6.6	16.8
437-0126-01	5.3	13.5	22.3	56.6	2.0	5.1	—	—	25.2	64.0	—	—	—	—	—	—	5.25	13.3

*These instruments mount with sliding tracks to a standard 19-inch-wide rack. Rear support for sliding tracks is required, such as an enclosed rack.