


TEKTRONIX®

SUPPLEMENT NO. 2 TO 1973 CATALOG

NEW PRODUCTS and LITERATURE

7000-SERIES PRODUCTS



Tektronix expands the world of waveform measurement with the introduction of the **Digital Processing Oscilloscope**. The unit consists of three basic sections: acquisition, processing and display. The acquisition and display sections are the top and bottom sections of the 7704A. Until now the 7704A has been marketed only as a modern laboratory oscilloscope. With a 200-MHz mainframe bandwidth, high writing rate CRT, CRT READOUT, space for up to 4 plug-in units (more than 30 different plug-in units available), the 7704A is one of the highest performance oscilloscopes available.

Now with the introduction of the P7001 Processor, Tektronix greatly expands waveform measurement capability. The P7001 serves as a sophisticated interface unit to a powerful modern minicomputer. The Processor permits realtime Analog-to-Digital conversion, storage of up to four different waveforms and scale factors in self-contained core memory, recall and display of stored waveforms, and computer interfacing.

A/D conversion produces 10-bit words which are sent to the internal memory or external computer. Complete waveforms contain 512 data points along with the CRT READOUT factors, such as vertical volts per division and horizontal time per division. Although a waveform is stored in discrete points, a stored waveform being displayed appears in continuous form. Data points from memory are processed through a special vector generator circuit which causes the CRT to trace a line from point to point.

Under computer control, waveforms may be stored in memory, processed and returned to the P7001 for storage and display. A wide variety of operations may be performed on waveforms ranging from the simple addition or subtraction of two waveforms, to sophisticated Fast Fourier Transform operations. The computer has access to the CRT character generator circuits, permitting the computer to send short messages to the oscilloscope viewer. Up to 80 characters (40 across the top of the CRT screen, 40 at the bottom) may be displayed.

The Digital Processing Oscilloscope is offered in many stand-alone forms. Following are two examples of the configurations available. Example No. 1 consists of:

- 1—A7704 Acquisition Unit
- 1—P7001 Processor Unit
- 1—D7704 Display Unit
- 2—7A16A Vertical Amplifier Plug-In Units
- 1—7B70 Time Base Plug-In Unit
- 1—7B71 Time Base Plug-In Unit
- 1—DEC PDP-11/05™ Minicomputer with 8k core memory
- 1—Teletype™ Unit
- APD BASIC—I™ Software Operating System

Example No. 2 includes the above equipment with the following substitutions and additions:

- 1—DEC PDP-11/05 Minicomputer with 16K core memory
- 1—4010-1 Opt 2A Tektronix Graphic Computer Terminal
- APD BASIC II™ Software Operating System
- 1—Scope-Mobile® Cart (houses APD and Computer)
- 1—4911 Tape Reader/Perforator Unit

The Digital Processing Oscilloscope will prove useful in laboratories, research and development facilities, universities, environmental research studies, in fact anywhere that sophisticated computerized measurements are required. Using 13 of the 16 user-option pushbuttons on the P7001 any one of up to 13 computer stored measurement routines may be initiated by pressing the proper button. Best of all the user has complete freedom to program the routines. Supplied with either system, APD BASIC permits anyone familiar with the BASIC computer language to easily and quickly program the most complicated and sophisticated measurement routines. When not performing as a system, the 7704A Oscilloscope and the PDP-11 computer are available for independent usage.

For further information, check the inquiry card.

PORTABLE OSCILLOSCOPES



The 212 is a DUAL TRACE, 500 kHz, 3 x 5¼ x 9 inch oscilloscope that weighs just 3.4 pounds. Like the 211, a single trace twin, the 212 is double insulated permitting safer "elevated" scope measurements and built of impact-resistant plastics for application in severe environments. Integral 1 MΩ probes store in specially designed compartments when not in use. These probes are color-coded with the vertical deflection controls to minimize measurement error. Trigger controls are simplified to one rotary control. Up to 5 hours operation are provided from internal batteries.

212 Portable Oscilloscope\$725

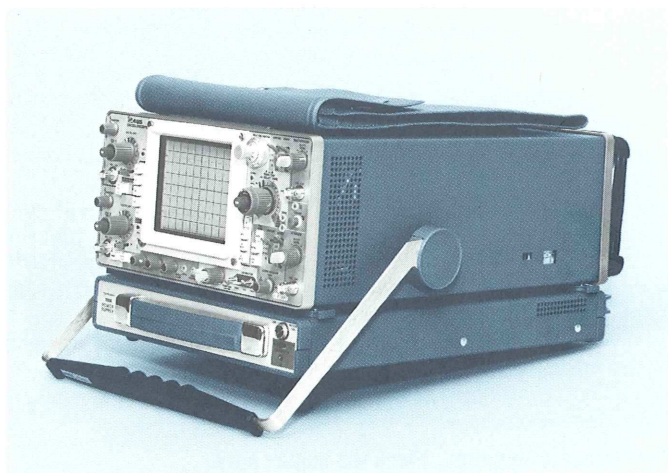


The 1105 Battery Power Supply provides battery and DC power capability to any TEKTRONIX 400-Series portable oscilloscope, as well as other instrumentation capable of operating on the 60-Hz squarewave output from the 1105.

The 1105 provides battery, or DC operation, without the sacrifices in gain, bandwidth, sweep speed or CRT writing rate normally associated with battery powered instruments.

The 1105, being a separate package, offers several other advantages over self-contained battery powered instruments. For example, it permits carrying battery capability only when needed; allows carrying two light packages instead of one heavy one; permits using the instrument while batteries are recharging; allows use of other instruments where power is not available; and most important permits the purchase of instruments for performance, not just battery power.

1105 Battery Power Supply\$475



The 1106 Battery Pack provides compact battery operation for the Option 7 version of the 465 and 475. The addition of Option 7 allows these scopes to operate on 12 or 24 VDC.

The 1106 Battery Pack supplies 24 VDC with 140 watt-hour capability and is designed to attach to the feet of the 465 or 475, providing an easily-carried single package. When the walk is a long one, the 1106 can be quickly detached from the scope to provide two packages of almost equal weight, each with its own handle.

The 1106 has a built-in battery charger so the batteries may be charged while the scope is being used elsewhere.

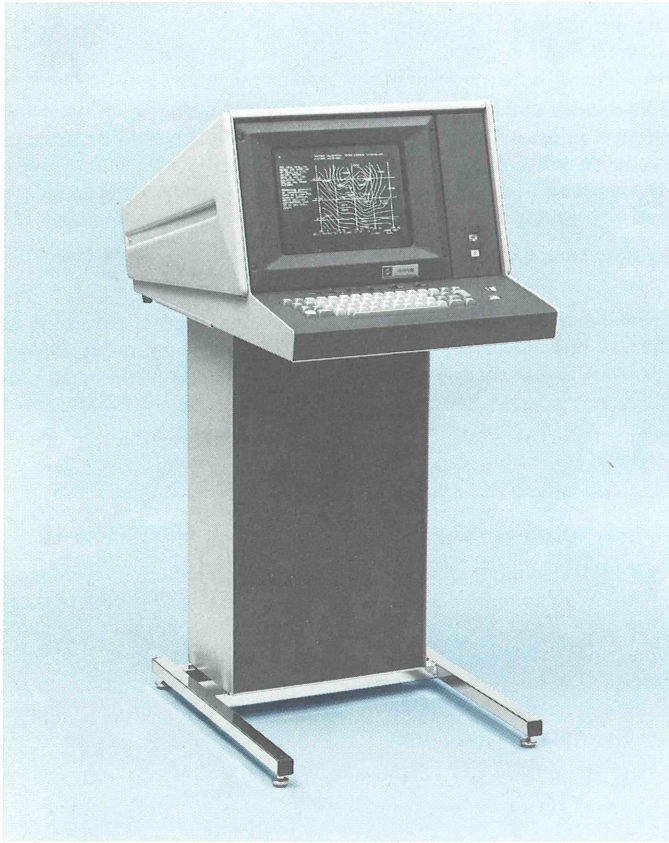
Modification kits are available for adding Option 7 to existing 465 and 475 Oscilloscopes.

1106 Battery Pack\$250

040-0650-00 Option 7 Modification Kit for 465\$125

040-0665-00 Option 7 Modification Kit for 475.....\$125

COMPUTER TERMINAL PRODUCTS



The **4012 Computer Display Terminal** offers new operating versatility in low-cost computer graphics. TEKTRONIX direct-view bistable storage provides clear, flicker-free CRT display with excellent resolution on every part of the display screen. High-density alphanumeric and graphic displays contain as many as 2520 alphanumeric characters on 35 lines of 72 characters each. Addressable points for graphic operation are 1024 in X and 1024 in Y planes, with 780 in the Y plane and 1024 in the X viewable on screen.

The keyboard includes the full ASCII character set of 96 printing characters with both upper and lower case letters.

Three modes of operation are provided: Alphanumeric, Graphic Display (Graf) and Interactive Graphics (Gin).

The 4012 is supported by the TEKTRONIX PLOT-10 Software system. Hard copies of all 4012 displays can be made with the 4610 Hard Copy Unit mated to the terminal.

4012 Computer Display Terminal\$4950



The **4013 Computer Display Terminal**—APL (A Programming Language) makes computer graphics a faster, more effective procedure and makes programming easier for scientists, mathematicians and educators. APL operation is a feature of the new 4013 Computer Display Terminal. This versatile new terminal utilizes the TEKTRONIX direct-view bistable storage CRT. In addition to the APL character set, the keyboard features the complete ASCII character set of 96 printing characters, including both upper and lower case letters.

The 4013 is an even more effective tool for data communication when used with the new TEKTRONIX PLOT-10 APL/Graph software or with the PLOT-10 software developed for the 4010-Series Computer Display Terminals.

As with other TEKTRONIX Computer Display Terminals, hard copies of all displays can be made in seconds, and at minimum cost by using the 4013 with the 4610 Hard Copy Unit.

4013 Computer Display Terminal\$5450

Rackmount versions of the 4010 Family of Computer Display Terminals are now available from Tektronix, Inc. These terminals consist of two sections connected by a permanently attached cable for intercommunication. All electrical and environmental specifications are the same as the standard versions.

R4010 Computer Display Terminal\$4250

R4010-1 Computer Display Terminal\$4550

R4012 Computer Display Terminal\$5250

R4013 Computer Display Terminal\$5750

SOFTWARE PRODUCTS

Computer Display Terminal Software, collectively designated as PLOT-10, permits Tektronix terminal users to develop new graphic applications, to enhance those which already exist, and support a full range of alphanumeric capabilities as well.

Major PLOT-10 programs include:

PLOT-10/Terminal Control System. The Terminal Control System (TCS) software package is a group of FORTRAN IV subroutines, forming the base for the fullest use of both the graphic and special alphanumeric terminal capabilities.

TCS is a tool to make graphic terminals a useful medium of information display. Designed to be as close to a "pencil and paper" replacement as possible—TCS can do complex line drawing with windowing and clipping.

Normal alphanumeric formatting functions, such as tab setting and margin setting, are supported by TCS. Routines are also included for support of specific features, such as erasing the screen, and homing the alphanumeric cursor.

An extremely useful terminal feature is the ability to perform graphic coordinate input with a graphic cross-hair. TCS supports this function in a straightforward manner, allowing the user to input points in the coordinate system he is using.

TCS can be a valuable tool in creating graphic application programs, and in interfacing to existing application programs, such as incremental plot previewing.

Terminal Control System Standard FORTRAN Subroutine Package 4010-Series:

User's Manual and Paper Source Tape,	
Part No. 062-1474-01\$325
User's Manual and Source Card Deck,	
Part No. 062-1474-02\$325

A specific implementation of TCS is available for DEC PDP-11 users under DOS. This implementation is a mixture of FORTRAN and assembly language code and is completely compatible with the normal FORTRAN version of TCS. It offers a compact graphic software package to PDP-11 users with DOS.

Implementation for PDP-11 with DOS:

User's Manual and Magnetic Tape	
Part No. 062-1529-03\$475

Another implementation of TCS is available for IBM Systems with TSO.

Implementation for IBM with TSO:

User's Manual and Source Card Deck,	
Part No. 062-1495-02\$475

PLOT-10/Advanced Graphing-II. The Advanced Graphing-II software package, written in FORTRAN, aids a wide range of users in computer graphing. Advanced Graphing-II relieves the user of the major burden in plotting arrays of data, including axis generation, scaling, and labeling tasks.

Advanced Graphing-II provides a full complement of basic routines to allow an experienced programmer or analyst to develop graphic reports. Next, a programmer can, with minimum effort, do plotting with a series of user-specified default conditions. Finally, an interactive graphic level is provided for the layman to develop specific charts and graphs. User data may be shown in a variety of graphic formats on cartesian, semi-log, log-log, polar, and time series coordinate systems.

NOTE: Advanced Graphing-II software requires the Terminal Control System package for operation.

User's Manual and Source Card Deck,	
Part No. 062-1530-02\$500

PLOT-10/Display Multiplexer Utility Routines. Tektronix now provides a Display Multiplexer, which permits the use of remote monitors with any of the 4010 family of computer terminals.

A series of FORTRAN subroutines has been built, using TCS to permit individual or multiple addressing of numerous monitors, and/or the terminal itself. It offers control of all remote monitors, including erasing an individual screen, generating hard copy, and initiating transmission of data from a scan converter to a video screen.

NOTE: The Display Multiplexer Utility Routines require Terminal Control System for operation.

User's Manual and Source Card Deck,	
Part No. 062-1524-02\$75

PLOT-10/Character Generation System. Designed to use facilities offered in TCS, this package of FORTRAN IV subroutines allows the software generation and display of complex character sets. Two character sets are initially defined and provided for the user. First is a simple, minimum stroke character set which contains upper case characters and numbers only. Second is a more complex set which contains both upper and lower case characters, as well as numbers, and a large group of special characters.

NOTE: The Character Generation System requires Terminal Control System for operation.

User's Manual and Paper Source Tape,	
Part No. 062-1494-01\$100
User's Manual and Source Card Deck,	
Part No. 062-1494-02\$100

PLOT-10/Preview Routines for CalComp Plotters. Many people interested in computer terminals have been using CalComp plotters for some time. The Preview Routines enhance existing CalComp graphic systems by allowing them to preview plots for correction before drawing them on a CalComp plotter device.

The Preview Routines are written in FORTRAN and designed to make full use of the windowing capabilities in TCS. This facilitates the previewing of large complex plots, in whole or part.

NOTE: Preview Routines for CalComp Plotters require Terminal Control System for operation.

User's Manual and Paper Source Tape,	
Part No. 062-1526-01\$75
User's Manual and Source Card Deck,	
Part No. 062-1526-02\$75

TELEVISION PRODUCTS



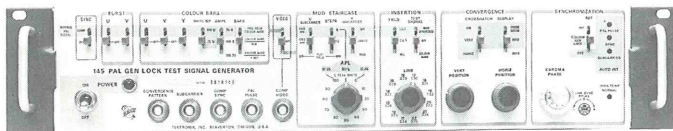
The 1441 VIR Signal Deleter/Inserter provides deletion of signals on a selected line during the vertical interval, and insertion of the VIRS (Vertical Interval Reference Signal) on the selected line. The VIR Signal is internally generated by the 1441. Deletion and insertion functions are controlled remotely.

1441 VIR Signal Deleter/Inserter\$1325



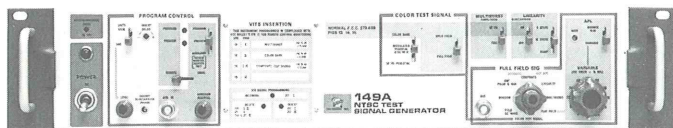
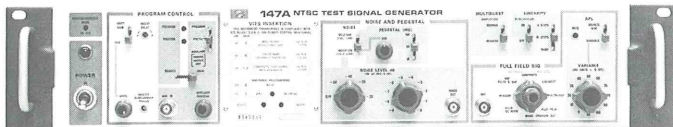
The 1440 VIRS Automatic Video Corrector is an "in-line" NTSC processing amplifier which can use the VIRS (Vertical Interval Reference Signal) to automatically correct video gain, chrominance to luminance gain ratio, setup level, burst phase relative to chroma (hue), burst gain, and sync gain. The 1440 can also be set for manual operation with all corrections remotely controlled.

1440 VIRS Automatic Video Corrector\$2450



The 145 PAL Gen-Lock Test Signal Generator provides sync and timing pulses and test signals for 625-line 50-Hz field standards. The 145 operates as either a master or a gen-locked sync pulse generator. Two gen-locking rates are provided; slow and fast. Three operating modes provide full-field colour bars, staircase and convergence test signals, plus insertion test signals.

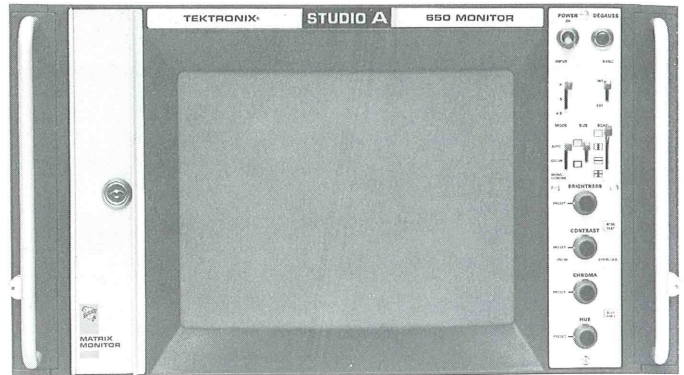
145 PAL Test Signal Generator\$3500



The 147A and 149A NTSC Test Signal Generators now offer expanded signal generating capabilities. In addition to the features found on the 147 and 149, these new "A" models offer remote control of black burst synchronization, addition of a processing amplifier, automatic operation to prevent malfunction of transmitter if incoming program is lost, and protection for the program material when test signals are added to the video signal.

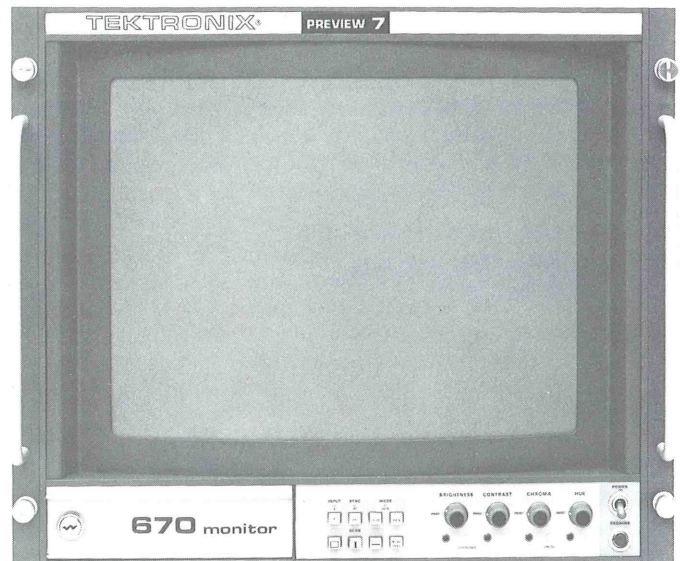
147A NTSC Test Signal Generator\$2975

149A NTSC Test Signal Generator\$3975



Chroma matrix correction is now included as a standard feature on all 650-Series NTSC monitors. This feature allows you to view the program material with essentially the same chrominance characteristics as a modern home receiver. The correction matrix may be switched out by a front-panel control to allow test and setup with a strict NTSC demodulation characteristic.

650-Series NTSC Color Picture Monitors\$2500



The 670-Series Color Television Picture Monitor provides a 17-inch display for general broadcast studio monitoring applications where high quality, stability, and accuracy are essential. Use of a 17-inch Trinitron® kinescope results in a monitor which requires a minimum of adjustment with maximum long-term stability.

670 NTSC Color TV Picture Monitor\$2500

®Registered trademark SONY Corporation.

NEW LITERATURE AVAILABLE

The 7000-Series Oscilloscope Systems Booklet provides information on the growing 7000 Series from Tektronix, Inc. Included in this booklet are product specifications on the complete 7000-Series line, reference and application information for 7000-Series Oscilloscopes, and accessories to enhance the usefulness of these instruments. The 7000 Series includes real-time oscilloscopes to 1 GHz, a ruggedized oscilloscope system, and storage oscilloscopes with stored writing speed up to 200 cm/ μ s. Plug-ins include: conventional amplifiers and time base units, sampling, spectrum analyzers, TDR, curve tracer, differential amplifiers, digital delay unit, digital multimeter, and digital counters.

A new **Portable Oscilloscope Family Booklet** describes the complete line of TEKTRONIX portable oscilloscopes. It includes the 200 Series, 300 Series, 400 Series and the new 1105 Power Supply and the 1106 Battery Pack.

A new **Spectrum Analyzer brochure** presents the reasons why the TEKTRONIX 7L12 is your best spectrum analyzer choice in the 100 kHz to 1800 MHz range. This brochure provides basic reference information on spectrum analyzers and a glossary of spectrum analyzer terms. It also presents the benefits of a plug-in spectrum analyzer and the advantages of the 7L12 being part of the expanding TEKTRONIX 7000-Series Oscilloscope family.

Radiometry and Photometry pamphlet provides some of the background information required to make radiometry and photometry measurements. Charts and graphs are used to illustrate the concepts discussed. Among the subjects covered are the basics of radiometry and photometry, light sources, and light sensors.

Transducer Application Handbook provides a practical guide to the use of transducers and the interpretation of the measurement results. Briefly explains some of the instrumentation available, provides some basic information on the proper use of transducers, and gives a detailed description of some typical tests using transducers.

The **1973 Computer Display Terminal Catalog** includes information on all of the computer display terminals and related products available from Tektronix, Inc. In addition to complete product specifications, this 40-page catalog provides application and reference information for computer terminals, along with a description of the PLOT-10 software available to support the TEKTRONIX Computer Display Terminals.

THE FOLLOWING PRODUCTS WERE INCLUDED IN THE NOVEMBER 1972 NEW PRODUCT SUPPLEMENT

465 and 475 Portable Oscilloscopes

577 Curve Tracer Measurement System

R7903 Oscilloscope

7603N Option 11S Oscilloscope System
(AN/USM-281C)

7D11 Digital Delay Unit

7D15 Universal Counter/Timer

J16 Option 2 Digital Photometer/Radiometer

DM64 Oscilloscope

D83 Oscilloscope