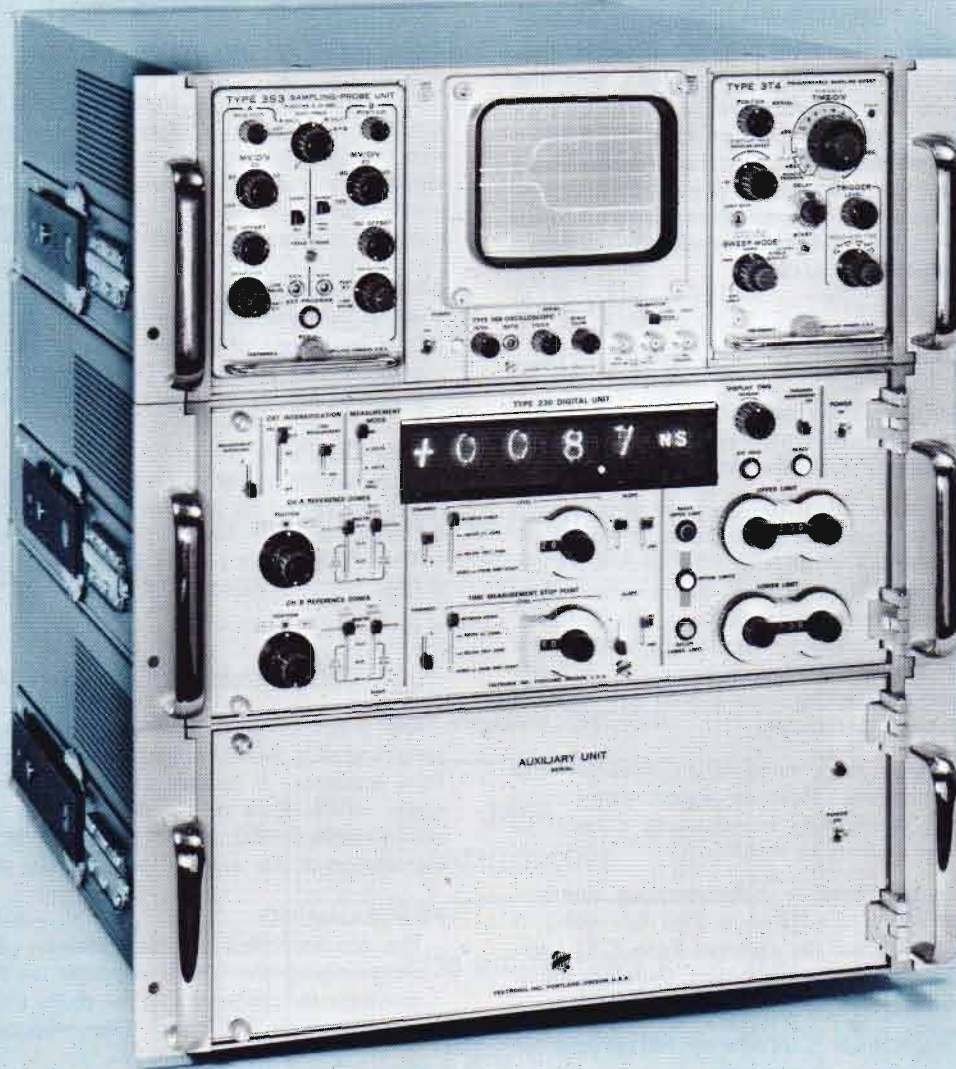


# TYPE S-3100

## Programmable Measurement System

# NEW



- **>100 MEASUREMENTS PER SECOND**
- **PROGRAMMABLE SUB-NANOSECOND MEASUREMENTS**
- **PROGRAMMABLE VERTICAL AMPLIFIER UNIT**
- **PROGRAMMABLE TIME-BASE UNIT**
- **PARALLEL PROGRAMMING**
- **REAR-PANEL INPUT SIGNAL CONNECTORS**
- **PARALLEL BCD DATA OUTPUT (1 2 4 8)**
- **AVAILABLE OPTIONS:**
  - **PROGRAMMABLE SELF-CALIBRATION ( $\pm 1\%$ )**
  - **PROBE REFERENCE CHOPPERS**
  - **REAL-TIME MEASUREMENT CAPABILITY**

The Tektronix Type S-3100 is a high-speed programmable system designed to satisfy dynamic switching time measurements. It features digital programming, measurement speeds greater than 100 measurements per second, and programmable vertical and horizontal sampling units.

The system is comprised of a special Type 568 Oscilloscope, Type 230 Digital Unit, an Auxiliary Unit, a special programmable sampling time-base and special programmable sampling vertical units, with either a 50- $\Omega$  input or a 100-k $\Omega$ , 2-pF input.

# TYPE S-3100

The Type S-3100 measurement system is designed to be externally programmed for use in high-speed measurement systems. All of its measurement functions can be programmed by means of parallel ground closures or logic levels. The programming is achieved with a maximum of 175 program lines (145 lines without self-calibration) using negative logic (true equals ground or less than 1 V, and false equals open or greater than 6 V).

The typical accuracy of the Type S-3100 is within 3%. A self-calibration option is available (ordered with the Type S-3100) that can be programmed to verify and/or adjust sweep rates and vertical deflection factors to within 1%. Other optional accessories available with the Type S-3100 system include programmable probe attenuators, probe choppers for absolute voltage measurements, and the R283 Real-Time Adapter that extends the system's measurement capabilities to 1 s/div.

## WIDE RANGE OF MEASUREMENT CAPABILITY

Type S-3100 Digital System measures nanosecond and microsecond signals by means of equivalent-time sampling; millisecond and slower signals by real-time sampling.

Measurement rates greater than 100 measurements/second are achieved when using equivalent sweep rates of 100 ns/div or faster, and through the use of programming techniques designed to optimize the measurement rates. Measurement rates can be dependent upon programming devices. For example, some mechanical programmers are limited to approximately 4 measurements per second. While using a computer, or other high-speed programming device, the Type S-3100 can make in excess of 100 measurements per second.

At slower equivalent sweep rates, measurement rates decrease because of sampling limitations. However, measurement rates at all sweep rates are significantly increased as a result of improved measurement and sampling techniques.

The system can be programmed to make sampling measurements from 1 ns/div to 200  $\mu$ s/div (10 ns to 2 ms full scale). If slower sweep rates are required, the optional Type R283 Real-Time Adapter can be integrated into the system, thereby extending the system's capability to 1 s/div.

Amplitude measurements from 5 mV/div to 100 mV/div (40 to 800 mV full scale) are also programmable.

## TYPICAL MEASUREMENTS

Typical measurements include risetime, delay time, storage time, fall time, pulse width, pulse amplitude and other specific time and voltage measurements. With the probe-chopper option, the system can make DC and/or pulse voltage measurements with respect to ground.

## TYPE R568 OSCILLOSCOPE

The Type R568 Oscilloscope used in the Type S-3100 System has vertical signal inputs and trigger signal inputs on the rear panel. The oscilloscope provides analog displays of signals to be measured by the digital system and is used in setting up measurement programs and in verifying measurements.

## TYPE R230 DIGITAL UNIT

The Type R230 Digital Unit used in the Type S-3100 System is modified to provide increased measurement speeds when used with the special programmable sampling time-base unit. This modification resets the time-base unit at the end of the measurement or at the end of the reference zone. This feature permits the increased measurement speed of the Type S-3100.

### PROGRAMMING

All of the Type 230's measurement functions can be programmed by means of ground closures or logic levels. The programming is achieved with 104 parallel program lines using negative logic (true = gnd or  $<2$  V; false = open or  $>6$  V).

### DATA OUTPUT

Data outputs available on the rear-panel of the Type 230 permit the recording of measurement polarity, displayed digits, units of measure, decimal point, and measurement limit results. The information is parallel BCD code (1 2 4 8; true = ground; false = +12 Volts).

## PROGRAMMABLE TIME-BASE UNIT

The programmable sampling time-base has calibrated and programmable sweep ranges from 1 ns/div to 200  $\mu$ s/div in a 1-2-5 sequence. It accepts trigger signal inputs via a rear connector on the Type 568. A measurement speed-up modification allows the Type 230 to reset the sweep at the end of the measurement or at the end of the reference zone.

### PROGRAMMING

The Auxiliary Unit provides common programming logic for programming the time/div range and a digital to analog converter for programming the delay time control. The sweep range requires 5 program lines with negative logic.

Delay time is programmed with 12 lines and provides from 1 through 999 steps in 1-ns steps (1-ns/div to 100-ns/div range); 100-ns steps (200-ns/div to 10- $\mu$ s/div range); 1- $\mu$ s steps (20- $\mu$ s/div to 100- $\mu$ s/div range).

Samples per sweep can be programmed to provide 100 samples/div or 10 samples/div. The Type 230 Digital Unit can program the time-base unit to sweep at 10 samples/div during the non-measurement part of the sweep and then switch to 100 samples/div for maximum resolution during measurement time.

## PROGRAMMABLE DUAL-TRACE VERTICAL AMPLIFIER UNITS

Two programmable dual-trace vertical sampling units are available offering you a choice of input impedance and risetime capabilities. The sampling probe unit with the P6038 sampling probes has 100 k $\Omega$  paralleled by 2-pF input impedance and a 350-ps risetime. The 50- $\Omega$  input impedance unit has a 450-ps risetime.

The vertical amplifier units accept signal inputs via rear connectors on the Type 568 Oscilloscope, and have programmable mV/div and programmable DC offset. The vertical deflection factor range of both amplifier units is 5 mV/div to 100 mV/div.

### PROGRAMMING

The Auxiliary Unit provides two digital to analog converters for programming the DC offset. DC offset is programmed with 7 program lines, (50- $\Omega$  vertical amplifier — 10 mV to 850 mV range in 10-mV steps; 100-k $\Omega$  vertical amplifier — 5 mV to 455 mV range in 5-mV steps) and one line for + or — DC offset. The mV/div range is programmed with 6 program lines, 3 lines per channel.

## AUXILIARY UNIT

The Auxiliary Unit is an integral part of the Type S-3100 Programmable Measurement System. The Auxiliary Unit provides common negative logic for the time-base unit and the optional Type R283 Real-Time Adapter and provides digital to analog converters for DC offset and time delay. The Auxiliary Unit also provides the power supplies and accepts the circuit cards for the optional self-calibration feature.

## MECHANICAL CHARACTERISTICS

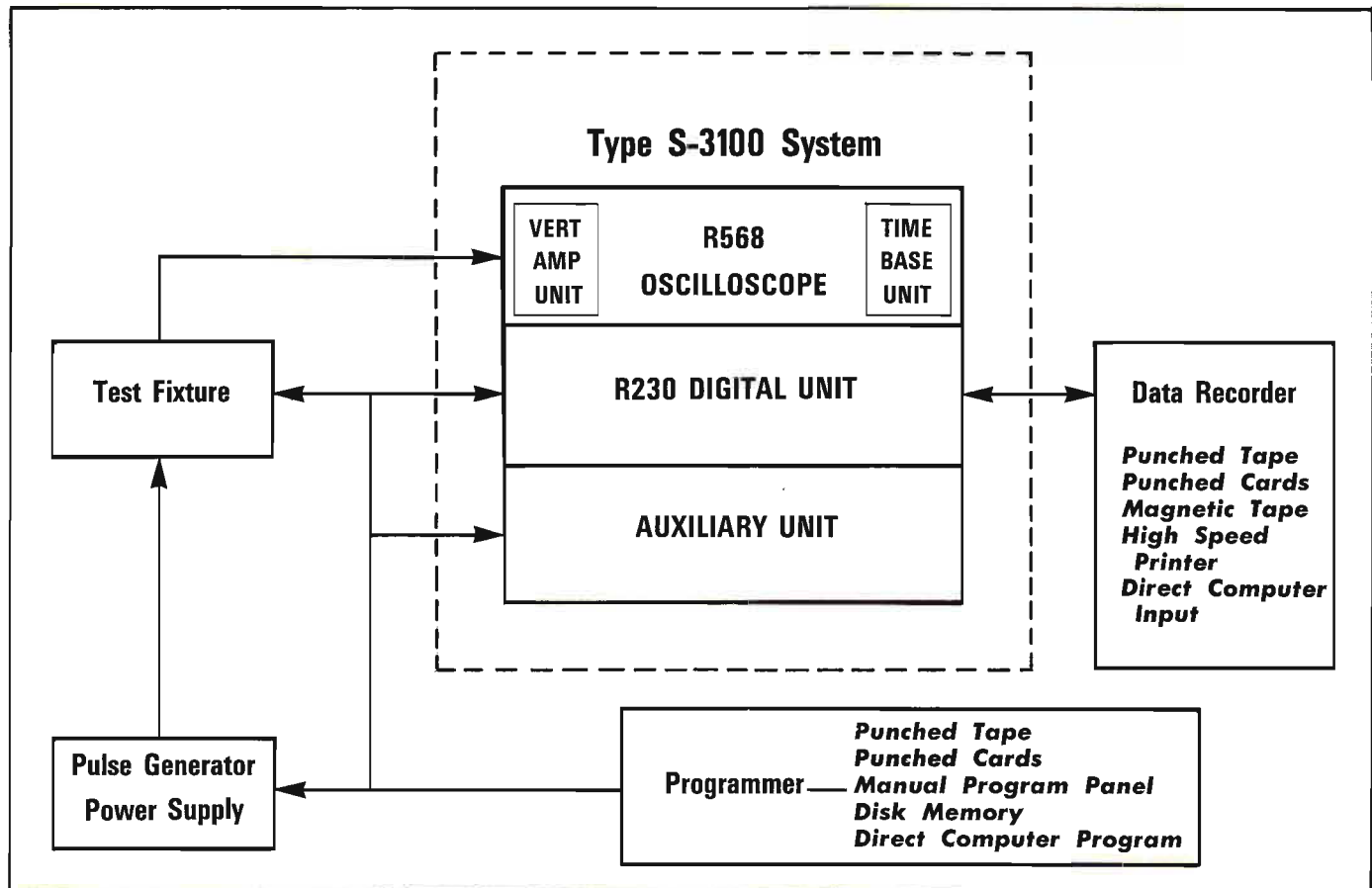
The three instruments in the Type S-3100 System have identical dimensions of 7 in high by 19 in wide by 22 $\frac{3}{4}$  in deep, providing a system height of 21 inches. They mount in a standard 19-inch rack on slideout tracks, and can be pulled out, tilted and locked in any one of seven positions for convenient access.

### TYPE S-3100 SYSTEM

Includes a modified Type R568 Oscilloscope, Type R230 Digital Unit, an Auxiliary Unit, a special programmable time-base and a programmable vertical amplifier unit (specify 50- $\Omega$  input or 100-k $\Omega$ , 2-pF input).

## TYPICAL AUTOMATIC MEASUREMENT SYSTEM

(For further information, consult your Field Engineer)



# TYPE S-3100

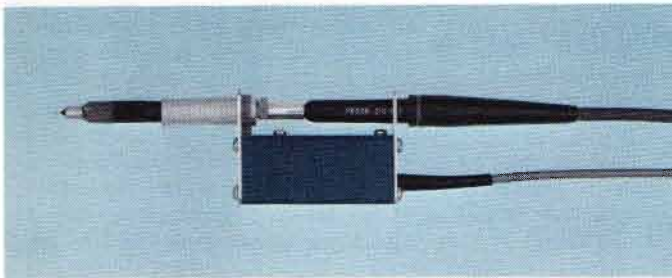
## OPTIONS

(Available with the Type S-3100 System)



### P6045 FET PROBE

The P6045 FET Probe when used with the 50- $\Omega$  vertical provides a risetime of less than 2 ns with an input resistance of 10 M $\Omega$  and a gain of 1. The input capacitance is approximately 5.5 pF and probe attenuators of X10 and X100 are provided. Accessory Power Supply included. Order 010-0205-00



### PROBE CHOPPERS

Probe choppers are available for the P6045 probe or P6038 sampling probe. With the probe chopper option, the Type S-3100 System can make DC and pulse voltage measurements with respect to ground.

Probe Chopper for P6038, order 119-0159-00

Probe Chopper for P6045, order 119-0160-00

### SELF-CALIBRATION

The self-calibration option checks and adjusts, when necessary, the vertical deflection factor and horizontal sweep rates to within 1%.\* This option adds cards to the auxiliary unit and modifies the vertical and horizontal units to permit automatic adjustment of the vertical deflection factor and the horizontal sweep rates. Order 018-0010-00

(Available only when ordering S-3100)

\*Accuracy of the 1 ns/div, 5 mV/div and 10 mV/div positions are within 3%, 5% and 2% respectively.

### REAL-TIME ADAPTER

If sweep rates slower than 200  $\mu$ s/cm are required, a Real-Time Adapter can be added to the system, thereby extending its measurement capabilities from 1 ms/div to 1 s/div (10 s full scale). An interface card in the Auxiliary Unit converts the program logic from positive logic to the standard Type S-3100's negative logic.

Order Type R283 MOD 646A

Please refer to Terms and Shipment, General Information page.

### PROGRAMMING UNITS

Equipment designed for programming the S-3100 is available from Tektronix. These include a program panel which provides up to five measurements and an optical punched tape reader with a serial to parallel converter.

### PROGRAM PANEL

This unit provides five separate measurement programs which can be automatically sequenced or manually selected by the operator. The operator or technician prepares a program by inserting pins at the appropriate points for the measurement parameters desired. Typically, only thirty lines of the 160 program lines need to be changed for a given measurement. The program panel may be set up to stop the measurement sequence on out-of-limits results.

### OPTICAL PUNCHED-TAPE READER

The optical punched-tape reader provides a means of obtaining a greater number of programmed measurements, limited only by the length of the tape used. The serial to parallel converter changes the punched tape output to the parallel program format required by the S-3100 system. The measurement rate of the S-3100 system is determined by the optical tape reader. This can be as high as twenty measurements per second.

For complete information, including price and availability, contact your local Tektronix Field Engineer.