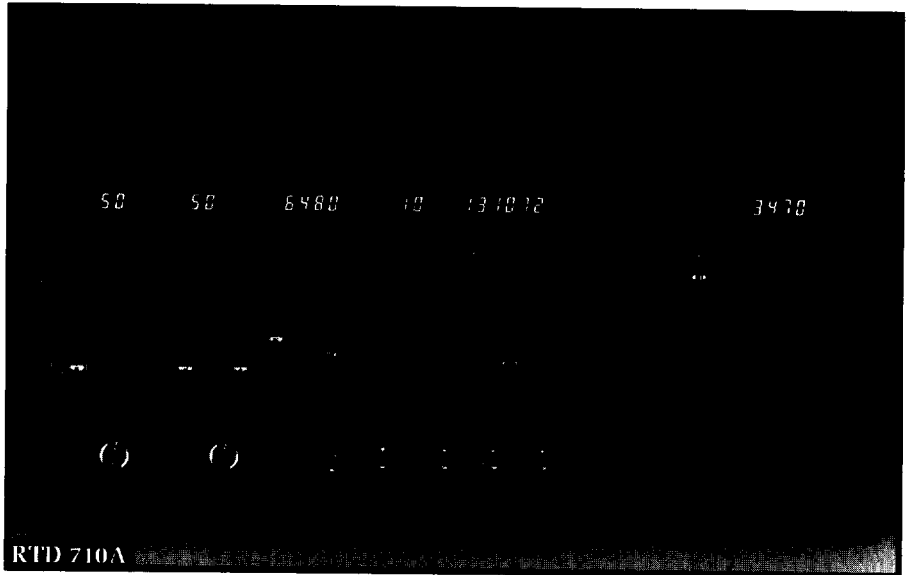


RTD 710A

*High resolution,
accuracy, and
speed.*

RTD 710A

- 10-Bit Vertical Resolution
- 200 MS/s Single Channel
- 100 MS/s Dual Channel
- 100 MHz Analog Bandwidth
- 256 K Word Waveform Memory
- Hardware Signal Averaging
- Internal/External A/D Clocking
- Cursor Measurements of Time, Voltage and Frequency

Transient Digitizer

RTD 710A Programmable Waveform Digitizer

RTD 710A Waveform Digitizer

- High Resolution and Accuracy
- Synchronized Clocking
- Long Record Length
- Expandable Waveform Memory

HIGH RESOLUTION, ACCURACY AND SPEED

The RTD 710A Waveform Digitizer provides 10-Bit vertical resolution at sample rates up to 200 Megasamples per second (MS/s). With four times the resolution of an 8-Bit digitizer and 60 dB of dynamic range, the RTD 710A provides excellent resolution of fine signal details.

The RTD 710A provides real-time digitizing up to 200 MS/s in the single-channel mode and to 100 MS/s in dual-channel mode. The high performance amplifier and attenuator system, along with Autocal circuitry, provides excellent signal fidelity prior to conversion from analog to digital form. The input system also provides fine control of full scale input range and offset, maximizing use of the 1024 available digitizing levels.

Other key features of the input system are accurate step response and rapid overdrive recovery. Clean step response is important for accurate capture of transient events. The fast overdrive recovery allows accurate

recording of small events occurring near large impulses, such as in pulse-echo applications and decaying exponential signals.

LONG MEMORY AND FLEXIBLE RECORDING

The RTD 710A contains 256 K (262, 144) words of high speed memory for storing waveform data. Memory can be allocated entirely to one channel or split between channels for simultaneous dual-channel digitizing.

Record length can be selected from 1024 points to the full 262, 144, in powers of two. When using shorter lengths, a correspondingly larger number of records are available. With a record length of 1024 points, up to 128 records per channel are available in the dual-channel mode, or up to 256 records if single channel is used.

DIRECT OUTPUT OF A/D DATA

For applications where the large internal memory of the RTD 710A is not enough, an external output port is provided. The output of both A/D converters is available up to the full 200 MS/s rate. External memory cache, such as the Tektronix 9504 FDC, may be added for capture of extremely long time windows with high resolution. Contact your Tektronix Sales Engineer for further information on memory cache products.

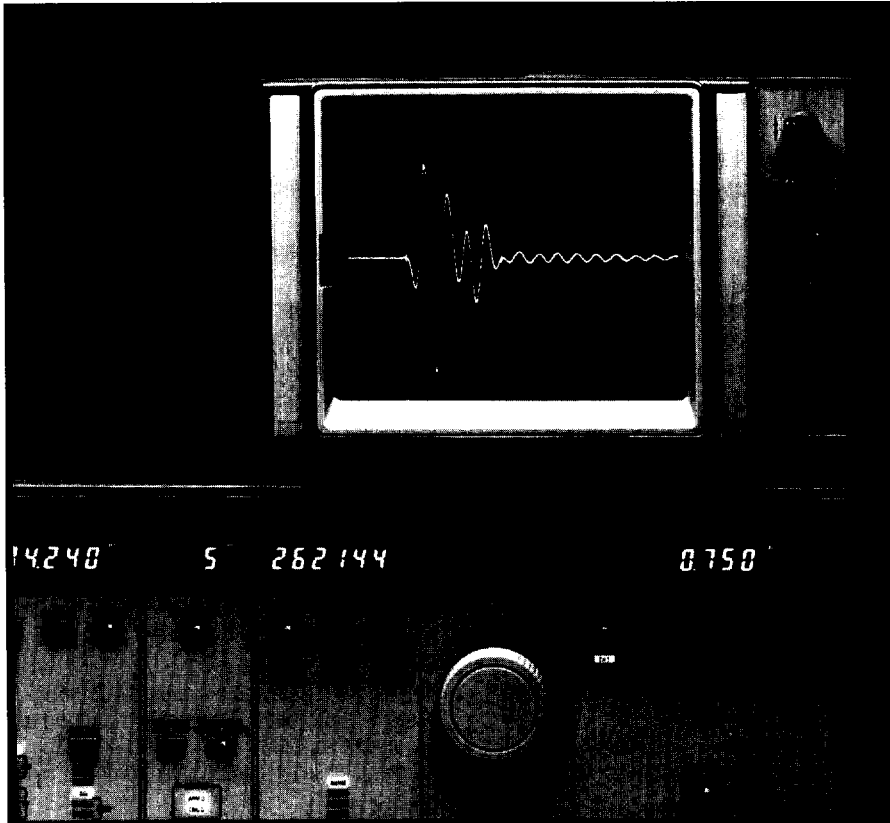
Product(s) available through your local Tektronix representative (listed in the back of this catalog) or call 1-800-426-2200.



Tektronix Measurement products are manufactured in ISO registered facilities.

A P P L I C A T I O N S

- Video and HDTV
- Ultrasonics, Radar, Lidar
- High Voltage Impulse Testing
- Power Supply and Power Conversion
- Communications and EW
- CCD Development
- Semiconductor and Hybrid Test
- ATE Systems



OTHER RECORDING MODES

The Auto-advance recording mode takes advantage of multiple records by capturing new waveform data on successive trigger events. In this manner a series of transient events can be captured in rapid succession and held for later analysis. Auto-advance recording is very powerful for capturing a series of lightning strikes, monitoring the time-varying output of a laser system, or recording other sequential transient phenomena.

In addition to the transient recording modes, the RTD 710A has built-in hardware signal averaging capability. This provides selectable powers-of-two averaging up to 16 K times to reduce random signal noise.

Envelope capture mode records minimum and maximum values for each data point over successive acquisitions. This offers a powerful technique for capturing spurious events and for monitoring signal drift.

INTERNAL AND EXTERNAL SAMPLE CONTROL

In addition to 66 internal time base settings, external strobing of the A/D converter system is supported. This provides the ability to synchronize sampling with external phenomena. The RTD 710A can be strobed from DC to 200 MHz. One typical application is CCD development where sampling can be synchronized with the CCD shift clock. Other applications are storage media testing and multiplexed data systems.

Sample rate switching is a unique feature provided to optimize usage of waveform memory. With sample rate switching it is possible to perform fast sampling during periods of interest and switch to a slower rate during quiescent periods. Up to five breakpoints (sample rate changes) are available within a record. One application is ultrasonics, where dead time between impulse and echo events can be sampled at a low rate while maintaining fast sampling over the events of interest. This can significantly reduce the amount of data transferred for processing in a computer.

VERSATILE TRIGGERING MODES

The RTD 710A offers many trigger modes to simplify the capture of complex signals. Standard oscilloscope-like triggering is provided along with enhancements such as LF or HF Reject, Bislope triggering and a Hysteresis trigger mode. Hysteresis mode allows the user to set an analog qualifying level as well as a trigger level, providing noise immunity and additional trigger selectivity.

A Video Trigger Option is available to allow the user to trigger on horizontal or vertical video SYNC pulses. This option makes it possible to trigger on a specific line number within a video field. Back porch clamp is provided.

In Comparison triggering mode, the RTD 710A continuously acquires events and compares them to reference-waveform values. If an event deviates from the range of values (Compare Out mode) or lies entirely within them (Compare In mode), the waveform is held for further analysis.

WAVEFORM ZOOM AND CURSOR MEASUREMENTS

When used in conjunction with an optional X-Y-Z monitor, captured waveforms can be viewed and measured in several ways. Cursors offer the capability to measure time, voltage and frequency. The RTD 710A offers horizontal and vertical display zoom, vertical positioning, and horizontal scrolling for easy viewing of the entire waveform or expansion of smaller portions. Both YT and XY types of displays are available.

Continued on next page.



Accessory

AM503S

Current Measurement Power

- Simultaneous AC/DC broadband current measurement system
- DC to 50 MHz (20A continuous/100A peak) with A6302 probe
- DC to 515 MHz (100A continuous/500A peak) with A6303 probe
- Clips onto conductor without having to break current

For complete selection information on all Accessory products, see page 446.

RTD 710A**Transient Digitizer****STANDALONE OR SYSTEM DIGITIZER**

The RTD 710A is fully programmable via the GPIB IEEE-488 and conforms to Tektronix Standard Codes and Formats. It also contains several useful waveform analysis commands, such as Min, Max, and Cross to increase throughput in test systems.

Hardcopies of the display can be made with the HC100 Color Plotter via the GPIB. Option 19 provides a blank instrument front panel. This eliminates the RTD 710A front-panel controls, reducing power consumption, instrument cost and susceptibility to undesired operator adjustment. This is particularly important in test-system environments.

Quicker system set-up time and the convenience of choosing from several previous instrument states is standard on the RTD 710A via non-volatile settings storage. Up to 20 different instrument states can be stored and recalled by either a front-panel push button or under computer control.

Measurement accuracy and proper functioning of the RTD 710A are confirmed by auto-calibration and self-test procedures. Self-test is automatically performed at power-on, and can be user-activated during operation.

Characteristics**VERTICAL**

Input Channels – Two, single-ended. Supports X10 and X100 encoded probes for high input-voltage applications. Simultaneous digitizing in dual-channel mode.

Input Ranges – ± 100 mV to ± 50 V (200 mV to 100 V p-p) in 28 steps.

Autocal Internal Reference – Provides calibration of range accuracy and zero-offset. Range accuracy is $\pm 0.4\%$ at 1 kHz and 97% full-scale, zero volt offset is $\pm 0.2\%$.

Input Offset – $\pm 199\%$ of input range, selectable in either percent or volts. Accuracy $\pm 1.5\%$ at $\pm 100\%$ DC offset.

Analog Bandwidth – DC to 100 MHz, 0°C to 40°C; DC to 90 MHz, 40°C to 50°C. Selectable bandwidth limiting at 20 MHz.

AC-Coupled Lower – 3 dB Point – 10 Hz or less.

Input R and C – $1\text{ M}\Omega \pm 2\%$, ≈ 24 pF.

Maximum Input Voltage – 250 V (DC + peak AC); AC component, 500 V p-p maximum at 1 kHz or less.

TIME BASE

Internal Clock Frequency – 200 MHz $\pm 0.001\%$.

Sample Rate: Internal Clock – CH 1 Only Mode: 200 MS/s to 5 S/s, 66 sampling steps. Dual-Channel Mode: 100 MS/s to 5 S/s, 65 sampling steps.

External Clock – CH 1 Only Mode: DC to 200 MHz, Dual-Channel Mode: DC to 100 MHz. ECL levels, periodic or non-periodic clock rate.

Sample Rate Switching – Up to five breakpoints within a record.

DIGITIZING

Vertical Resolution – 10-Bits provide 1024 discrete levels (60 dB dynamic range).

Maximum Sample Rate – Single-Channel Mode: 200 MS/s. Dual-Channel Mode: 100 MS/s.

Record Length per Channel –

CH 1 Only Mode		Dual-CH Mode	
Records	Length	Records/CH	Length/CH
1	262144	1	131072
2	131072	2	65536
4	65536	4	32768
8	32768	8	16384
16	16384	16	8192
32	8192	32	4096
64	4096	64	2048
128	2048	128	1024
256	1024	–	–

Averaging – Selectable from 2 to 16384 in a 2-4-8 binary sequence, 8 K per channel maximum record length averaged.

Enveloping – Selectable from 1 to 16384 in a 2-4-8 binary sequence or infinite.

TRIGGERING

Sources – Internal from CH 1 or CH 2, or External.

Trigger Coupling – AC, AC LF Reject, DC HF Reject, DC.

Slope – Positive, Negative, Bislope.

Modes – Auto, Normal, Single, Compare In, Compare Out, Hysteresis.

Post-Trigger Delay – From 0 to 262136 samples in Normal Mode, from 0 to 262128 samples in high speed (200 MS/s) mode.

Pre-Trigger Capture – To full record length less 8 samples for normal mode and full record length less 16 samples for high speed (200 MS/s) mode.

Arming Delay – Internal: 0, 10 Ms to 10 s in a 1-2-5 sequence; External arm input on rear panel.

TV Trigger – Selectable system-M and non-system-M protocols. Selectable triggering on any line (1 to 1280) within a field (1 or 2). TV blanking-level clamp (back porch).

DISPLAYS

Cursor Readout – 7-digit LED display for time, voltage and frequency.

Trigger Readout – 6-digit LED display for trigger level.

Record Length Readout – 6-digit LED display for record length and breakpoint location.

Range/Offset Readout – 4-digit LED display for range and offset settings; two displays, one for each channel.

COMPUTER INTERFACE

GPIB – IEEE-488.1 interface is standard for instrument control and waveform data transfer. Maximum transfer rate ≥ 250 KB/s. All instrument functions, settings, and operating modes are programmable, with the exception of the power switch.

Plotter Interface – HPGL Protocol, IEEE-488 interface.

Waveform Analysis Commands – Window, Minimum, Maximum, Base, Top, Positive Cross, Negative Cross, Mid, Mean, Peak to Peak.

Transient Digitizer

RTD 710A

DIGITIZERS

EXTERNAL SIGNALS

CRT Display – X,Y,Z: ± 1 and ± 5 V p-p, internally selectable (set to ± 1 V at factory).

Trigger Output – Positive True, TTL.

External Arm Input – TTL Compatible.

External Clock Input – ECL Signal Level, 50 Ω . DC to 200 MHz.

Clock Output – ECL signal level (open emitter out into 50 Ω).

Probe Calibration Output – 0 to +4 V $\pm 1\%$ square wave at 1 kHz $\pm 0.005\%$ into 1 M Ω .

Feed-through Connectors – Three 50 Ω coaxial cables for front-to-rear signal connections.

Direct A/D Output – 50-Pin AMPMODU MT connector. CH 1 and CH 2 digitized signals available. ECL-compatible signal levels. Maximum data rate is 100 Mwords/s (20-Bit word). Contact a Tektronix sales engineer for information on memory cache products and interfacing information.

ENVIRONMENTAL

Temperature Range – Operating: 0° to 50°C; Nonoperating: -30° to +70°C.

Humidity – 0 to 95% relative humidity (noncondensing).

Altitude – Operating: 4,570 m (15,000 ft.) max. Nonoperating: 15,240 m (50,000 ft.) max.

POWER

Line Frequency – 48 Hz to 440 Hz.

Power Consumption – 350 W fully optioned.

Line Voltage Range – 90 V AC to 132 V AC (115 V); 180 V AC to 250 V AC (230 V).

PHYSICAL CHARACTERISTICS

Dimensions	mm	in.
Width	429	16.9
Height	177	7.0
Depth	643	25.3
Weight \approx	kg	lb.
Net	23.5	51.8

ORDERING INFORMATION

RTD 710A

Waveform Digitizer.....**\$22,995**
Includes: (161-0123-00); Fuses (8A & 4A); Instruction Manual (070-7204-00); RTD 710A Instrument Interfacing Guide (070-7207-00).

Opt. 05 – Video Trigger.....**+\$1,495**

Opt. 11 – Adds 9504 Fast Data Cache for 8 Mwords Total Memory.....**+\$3,800**

Opt. 19 – Blank Front Panel (Includes Rackmount Assembly).....**-\$200**

Opt. 1R – Rackmount Package.....**+\$395**

INTERNATIONAL POWER PLUG OPTIONS

Opt. A1 – Universal Euro 220 V, 50 Hz.....**NC**

Opt. A2 – United Kingdom 240 V, 50 Hz.....**NC**

Opt. A3 – Australian 240 V, 50 Hz.....**NC**

Opt. A4 – North American 240 V, 60 Hz.....**NC**

Opt. A5 – Switzerland 220 V, 50 Hz.....**NC**

See General Customer Information Section for additional description.

RECOMMENDED ACCESSORIES

See page 446 for complete selection information.

PROBES

Differential – 100 MHz, Active Differential, 6 ft.

Order P6046.....**\$2,395**

Passive – 100 MHz, 13 pF/10 M Ω , 10X. Order P6109B.....**\$85**

100 MHz, 18 pF/10 M Ω , 1X/10X. Order P6129B.....**\$105**

High Voltage –

250 MHz, 2500 V, 2.5 pF/10 M Ω , Order P5100.....**\$199**

75 MHz, 20 kV, 3.0 pF/100 M Ω , 10 ft.

Order P6015A (Opt. 1R).....**\$1,040**

Current – 120 Hz – 60 MHz, 7.5 A peak. Order P6021.....**\$575**

935 Hz – 120 MHz, 3 A peak. Order P6022.....**\$610**

DC – 50 MHz System. Includes AM503A, A6302.

Order AM503S.....**\$2,795**

CAMERAS/PLOTTERS

Plotter– Four color. Order HC100 with Opt. 01.....**\$1,380**

CARTS
 Order K475.....**\$940**

ADDITIONAL ACCESSORIES

RTD 710A Service Manuals –

Vol. 1 Procedures. Order 070-7205-00.....**\$85**

Vol. 2 Schematics. Order 070-7206-01.....**\$75**

Rackmount Kit – Order 016-0886-02.....**\$520**

Power Strip – Four Outlet, 6 ft.,

Noise/Surge Suppression. Order 131-5342-01.....**\$48**

Product(s) available through your local Tektronix representative (listed in the back of this catalog) or call 1-800-426-2200.



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