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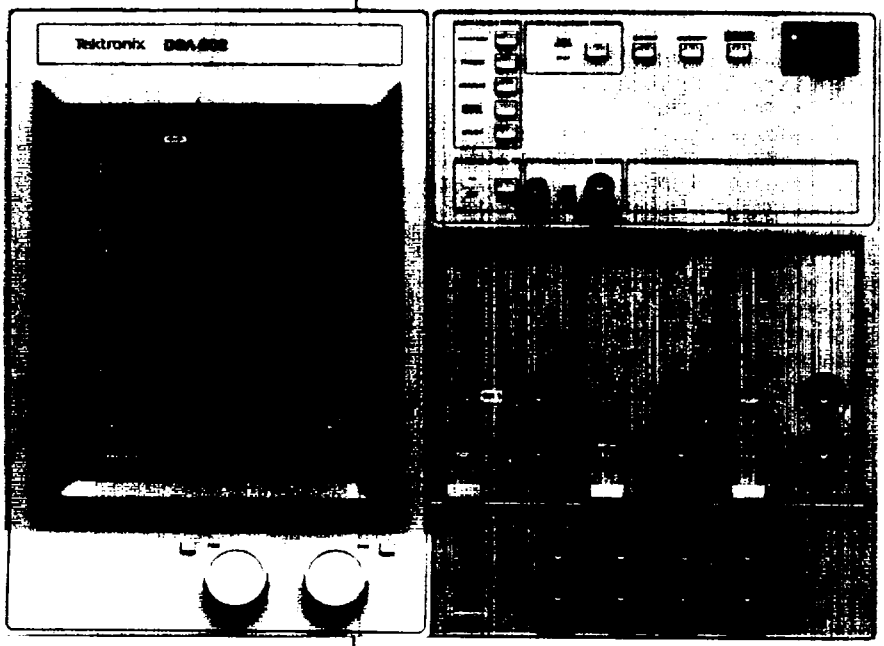
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Find the *Tektronix 670-9687* at our website: *Click HERE*

NEW DSA 601/DSA 602

Digitizing Signal Analyzers contain powerful internal digital signal processors that can process digitized signals up to 180 times per second.

- *2-GSamples/s Sampling Rate*
- *8-Bit Vertical Resolution*
- *1% Vertical Accuracy at the Probe Tip*
- *1-GHz System Bandwidth*
- *12 Channels of Acquisition, Display of 8 Waveforms*
- *Up to 4 Channels of Concurrent Single-Shot Capability*
- *Time, Event, Level, and Boolean Qualified Triggering*
- *2-ns Glitch Capture*



GPIB IEEE-488 *

** The DSA 601/DSA 602 comply with IEEE Standard 488.1-1987, RS-232C and Tektronix Standard Codes and Formats.*

DSA 601/DSA 602 DIGITIZING SIGNAL ANALYZERS

With standard waveform acquisition features such as a sampling rate of up to 2 GS/s, a bandwidth of 1 GHz, and record lengths selectable up to 32K points, the DSA 601 and DSA 602 Digitizing Signal Analyzers surpass any other digitizing acquisition system available. Add to this a multiple-microprocessor control platform and a dedicated TriStar Digital Signal Processor (DSP) and you get waveform processing and analysis capabilities in real time, that previously required "offline" processing by an external computer.

Equipped with three plug-in compartments and true dual time bases, the DSA 600 Series can acquire signals from up to 12 input channels – any combination of these 12 channels can display 8 waveforms on-screen simultaneously. In addition, true dual time bases permit simultaneous, single-shot capture and display of a main record and up to two window records for each channel. The eight-color display eases comparison of waveforms and parameters in the main and window areas.

Selectable triggering capabilities of the DSA 600 Series include basic and extended triggering functions. In the DSA 600 Series, basic triggering simply initiates main and window record acquisition. Extended triggering functions include time, event, level, and Boolean qualified triggering.

ADVANCED WAVEFORM PROCESSING

The dedicated TriStar DSP provides waveform capture, processing, and analysis features that place the DSA 600-Series Digitizing Signal Analyzers in a class of their own. Optimized for analysis of high-speed, single-shot, or repetitive signals, this proprietary CMOS processor makes possible comprehensive waveform analysis features such as real-time integer and floating point math operations, FFT magnitude and phase computations, Act on Delta, and signal dejitter. Advanced waveform calculations such as area and energy; eleven timing measurements, including propagation delay; amplitude measurements, including gain and true RMS; and live updating of waveform parameters are also included as part of the DSA 600-Series processing package.

Dedicated digital signal processing provides acquisition enhancement functions such as averaging and smoothing to selectively remove noise from the display. For example, averaging rates of up to 180 waveforms/second for repetitive integer waveforms and up to 90 waveforms/second for repetitive floating point waveforms are possible.

FFT (FAST FOURIER TRANSFORM)

If you need to examine the frequency spectrum of a waveform, the FFT function provides a means to automatically transform time-domain data into frequency-do-main data for spectral analysis.

Both time-domain and frequency-domain versions of the same signal can be simultaneously displayed "live" on the screen (see Figure 1). The FFT function is available for binary record lengths from 512 to 16K points. The information in the frequency domain can be expanded to provide a closer look at magnitude and phase plots.

ACT ON DELTA (PASS/FAIL TESTING)

The Act on Delta function detects when a user-specified number of points on a selected waveform fall outside the bounds of a reference waveform template, and executes one or more of five user-defined actions when this event occurs. These actions are save, repeat, chime, SRQ over IEEE-488, and hardcopy. The Act on Delta function is automatic, so an operator need not be present to detect and act on an event.

The template waveform may be a displayed or stored-envelope waveform. The stored-envelope waveform may be externally generated with an appropriate software package, such as the Tektronix Template Waveform Processing Program.

DEJITTER

The Dejitter function reduces the effect of time jitter caused by a noisy input signal; or it may be used to stabilize trigger holdoff by time. When used in conjunction with signal averaging, the Dejitter function maintains high frequency components that would otherwise be "averaged away", resulting in a better preserved signal.

THE USER INTERFACE

These comprehensive analysis functions, plus virtually all of the manual controls of the instrument – including plug-ins and probes – are accessible through a minimum of front panel buttons, two user-definable control knobs, and an easy-to-operate, eight-color, touch-screen interface. Operator menus are presented on the screen in an intuitive format that guides you through instrument setup and measurement acquisition. Selections are made by simply touching the designated areas of the CRT.

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Control of variable functions, such as vertical sensitivity or position, time base, trigger level, delay time, and cursor position is accomplished with the two control knobs located below the screen. In addition, all information needed to completely configure the DSA 600 Series and perform detailed analysis of waveforms is never more than two menus deep.

CONCURRENT, REAL-TIME ACQUISITION

Two, 8-bit digitizers in *the DSA 601* allow simultaneous, 500 MS/s, single-shot acquisition from two channels; or, you can elect to interleave the digitizers in order to obtain a 1 GS/s sample rate from one channel (see Figure 2 on page 42).

Interleaving can be enabled from the "Horizontal Description" touch-screen menu. When interleaving is active, the input signal path is internally shared between the digitizers. The clock for each digitizer is skewed by one-half the sample rate so that the input signal can be sampled every nanosecond.

The DSA 602 has four, 8-bit digitizers capable of 500-MS/s, simultaneous, single-shot acquisition from four channels; 1 GS/s from two channels; or, with digitizer interleaving enabled, 2 GS/s from one channel (see Figure 2 on page 42).

For each channel being acquired, one main and two window records may be acquired (main and window records in the DSA 600 Series are similar to main sweep and delayed sweep acquisitions in analog oscilloscopes). Window records provide enhanced detail in areas of interest on the main waveform.

1 GHz system bandwidth (available with the 11A72 Plug-in) captures frequency content up to Nyquist. And both mainframes are equipped with an anti-alias filter to prevent the inclusion of high-frequency information into low-frequency data.

RECORD LENGTH

Record length is selectable from 512 to 32,768 points, providing the ability to capture and analyze long, single-shot or repetitive events in detail.

The DSA 600 Series comes standard with more than 230,000 points of volatile memory which is shared between acquired and stored waveforms. Also standard is sufficient non-volatile memory for approximately ten settings.

To make the most of the capabilities of the DSA 600 Series, Option 4C, Non-Volatile RAM, provides more than 450,000 points of storage – enough memory for the most demanding applications. NVRAM stores waveform data when the instrument is turned off.

TRIGGERING

Trigger capability within the instrument is divided into two general categories: basic trigger and extended trigger. (Basic triggering is similar to standard level and slope triggering in analog oscilloscopes.) For basic trigger operation, TRIGA is associated with the main record and is referred to as the main trigger, while TRIGB is associated with the window record(s) and is referred to as the window trigger.

In extended trigger operation each trigger source is compared to its trigger level or threshold, and is determined to be either a high or low logic level. You may then choose to combine the trigger sources with Boolean algebra, qualify one with a level of the other (LEVEL QUALIFIED), qualify one or both by time (TIME QUALIFIED), or qualify the window by an event count (EVENT TRIGGERED), to form the main and window triggers. These extended trigger operations may be used alone or in combination for added flexibility in defining trigger events.

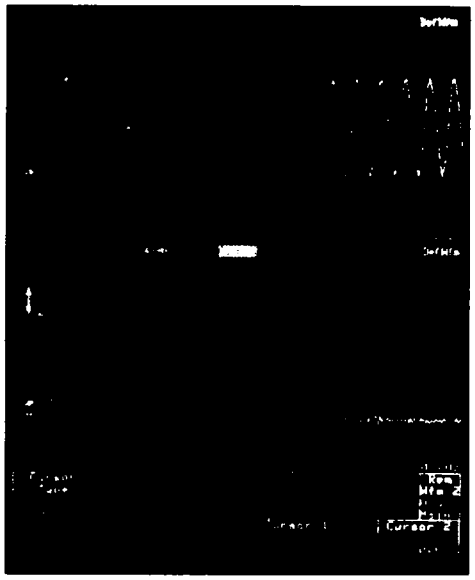


Figure 1. The TriStar Digital Signal Processor allows simultaneous display of "live" frequency-domain data concurrent with the real-time, time-domain signal.

TIME QUALIFIED TRIGGERING CONFIGURATIONS

Time-Qualified Triggering can be set in one of six possible configurations:

- True Duration < Time Interval
- True Duration > Time Interval
- True Duration Within Time Bracket
- True Duration Outside Time Bracket
- Comparison Timing < Time Interval
- Comparison Timing > Time Interval

Time qualified triggering provides the capability to trigger on and capture glitches as narrow as 2 nanoseconds.

QUICKSTART TRAINING PACKAGE

QuickStart contains application examples, and is a complete and portable training package. It can serve several users for thorough self-study or as a quick, easy reference.

The package comes complete with the QuickStart board, video, workbook, board reference, and power plug; and is included in the purchase price of the instrument.

NEW DSA 601/DSA 602

- *Simultaneous Display of Time and Frequency Domains*
- *Live FFT Magnitude and Phase Display*
- *Act on Delta (Pass/Fail Testing)*
- *32K-Point Record Length*
- *Labeling of Waveforms/ Settings*
- *Color Display*
- *Printer/Plotter Support*
- *Fully Programmable via GPIB and RS-232-C*
- *True Differential Capability*

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NEW DSA 601/DSA 602

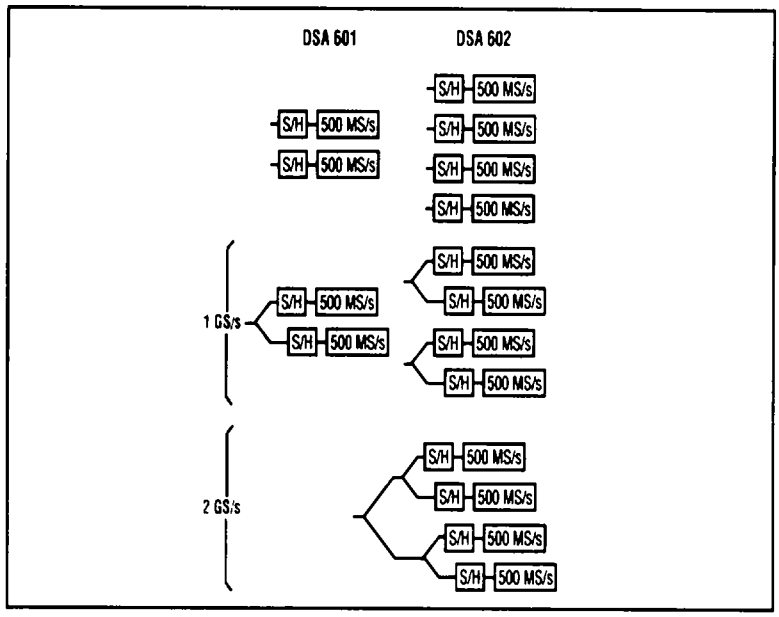


Figure 2. Digitizer interleaving allows for 1 GS/s maximum sample rate in the DSA 601 and 2 GS/s in the DSA 602.

REPETITIVE SINGLE-SHOT ACQUISITION

Repetitive Single-Shot Acquisition lets you automatically capture, store, label, and time and date stamp a waveform; re-arm the trigger; and then repeat this process up to 918 times. *1

Any number of repetitions, from 1 to 918 can be selected, depending on the record length.

The maximum repetition rate is 60 waveforms/s for a 512-point record length. The repetition rate is reduced for longer record lengths and slower sample rates.

Coupled with the DSA 600 Series extended trigger capabilities, the Repetitive Single-Shot Acquisition feature is a powerful tool for selectively capturing anomalous events within repetitive signals. This feature also makes it easy to store acquired waveforms for later examination using the Stored Waveform Scan capability.

STORED WAVEFORM SCAN

Stored Waveform Scan is a feature designed to allow rapid viewing of stored waveforms acquired during Repetitive Single-Shot Acquisition or Act on Delta. This feature lets you scan through a sequence of stored waveforms, recalling them one at a time, and displaying them at a user-selectable rate. The scan rate can be set to any value from 0.1 to 10 waveforms/s using the control knobs on the front panel. It lets you rapidly "flip through" a set of waveforms to see at a glance how the acquisitions change with time.

Stored Waveform Scan simplifies the process of viewing a large set of stored waveforms. It displays the waveforms without requiring the recall and deletion of each one separately. It may also be used to search for particular characteristic waveforms.

COLOR DISPLAY

The DSA 600 Series color display lets you easily distinguish superimposed waveforms and, if desired, adjust the color set to suit your particular needs. You can select up to eight colors from a palette of 4096. The high resolution screen results in a crisp display for viewing comfort. Color-keyed waveform names can be attached to the traces to further enhance waveform clarity and documentation.

*1 *Option 4C is required to obtain the maximum number of waveforms in the Repetitive Single-Shot Acquisition mode.*

Single-Shot Acquisitions —

	DSA 601		DSA 602		
Sample Rate	**500 MS/s**	**1 GS/s**	**500 MS/s**	**1 GS/s**	**2 GS/s**
Number of Channels	2	1	4	2	1
Time Resolution	2 ns	1 ns	2 ns	1 ns	500 ps
Record Length	512 to 10K pts	512 to 20K pts	512 to 10K pts	512 to 20K pts	512 to 32K pts

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CHARACTERISTICS

VERTICAL SYSTEM

Accuracy With Enhanced Accuracy – ≤1% for an 8-division signal.

Vertical Resolution – 8 bits. Resolution can be increased to 14 bits with signal averaging or smoothing.

Equivalent-Time Bandwidth – Determined by the plug-in used. See page 63.

Wide Dynamic Range – 1 mV/div to 10 V/div.

HORIZONTAL SYSTEM

Time Bases

Sweep Speeds – 200 ps/div to 100 s/div.

Record duration – 2.04 ns to 1024 s in 1-2-5 sequence.

Time Base Accuracy – +0.005%, -0.015%: 0 to 45°C.

Record Length – DSA 601: 512 to 20,480 pts (single shot); 512 to 32,768 pts (repetitive); DSA 602: 512 to 32,768 pts (both single shot and repetitive).

Sampling Rate – DSA 601: 1 GS/s max; DSA 602: 2 GS/s max.

Main Record Positioning – The main record is positioned with respect to the main trigger point. The maximum pretrigger is the last point in the main record. The maximum post trigger is the first point in the main record.

Windows – The main record plus two window records may be acquired and displayed. The window records may be different lengths and can have a different time/div than the main record.

Window Record Positioning – The window records may be positioned with respect to their own trigger points on the main record. Window triggers may be delayed from the main trigger by time or events.

Multi-Trace Pan and Zoom – Multiple traces may be panned and zoomed simultaneously.

Extended Pan and Zoom – A trace may be magnified to 1 pt/div.

Waveform Memory – More than 230K points of volatile memory shared between acquired and stored waveforms.

Settings Memory – Nonvolatile memory for approximately ten settings.

TRIGGERING SYSTEM

Range – ± Full Screen.

Bandwidth – 1 GHz max: 500 MHz for extended triggering.

Coupling and Sensitivity –

DC Coupled: 0.4 div from DC to 10 MHz, increasing to 1 div at maximum trigger bandwidth.

DC Noise Reject Coupled: 1.2 divs from DC to 10 MHz, increasing to 3 divs at maximum trigger bandwidth.

DC HF Reject Coupled: 0.5 divs from DC to 30 kHz.

AC Coupled: 0.4 div from 60 Hz to 10 MHz, increasing to 1 div at maximum trigger bandwidth.

AC Noise Reject Coupled: 1.2 divs from 60 Hz to 10 MHz, increasing to 3 divs at max trigger bandwidth.

AC HF Reject Coupled: 0.5 div from 60 Hz to 30 kHz.

AC LF Reject Coupled: 0.5 div from 80 kHz to 10 MHz, increasing to 1 div at max trigger bandwidth.

Holdoff Range – Main record min: 2 µs or less; max: 500 s. Window Record min: 35 ns; max: 1000 s.

WAVEFORM PROCESSING

Waveform Functions – Differentiate, integrate, interpolate, smooth, average, envelope, square root, logarithm, natural log, absolute value, exponential, signum, and dejitter.

Arithmetic Operators – Add, subtract, multiply, and divide.

FFT – Magnitude and phase; six window functions; noise floor: -60 dB; -70 dB with averaging.

Act on Delta – Save, repeat, chime, SRQ, and hardcopy.

MEASUREMENT SYSTEM

Amplitude – Min, max, mid, mean, p-p, gain, and RMS.

Timing – Rise, fall, width, delay, main-to-window trigger time, period, propagation delay, cross, phase, and frequency.

Area and Energy – Area +, area -, and energy.

Cursors – Single or dual dots, split or paired mode, horizontal and vertical bars, and measurement-zone delimiters.

CRT AND DISPLAY FEATURES

Standard CRT – 10 in. diagonal, color, magnetic deflection. Vertical raster-scan orientation.

Resolution – 552 horizontal by 704 vertical displayed pixels.

POWER REQUIREMENTS

Line Voltage Ranges – 90 to 132 V RMS; 180 to 250 V RMS.

Line Frequency – 48 to 72 Hz.

Maximum Power Consumption – DSA 601: 465 W max; DSA 602: 585 W max.

ENVIRONMENTAL AND SAFETY

Temperature – Operating: 0 to +45°C. Nonoperating: -40 to +75°C

Humidity – Operating and Nonoperating: Up to 95% relative humidity; up to +45°C

Altitude, Vibration, Shock, Bench Handling – Operating and Nonoperating: meets MIL-T-28800C, Type III, Class 5.

Electromagnetic Compatibility – Referenced to MIL-STD-461B. Meets FCC part 15, subpart J, class A. Meets VDE 0871/6.78 for Class "B".

Safety – Listed UL 1244; CSA Bulletin 556B, Sept. 1973; Tektronix self-certification to comply with IEC 348 recommendations.

NEW DSA 601/DSA 602

ORDERING INFORMATION

DSA 601 Digitizing Signal Analyzer **$21,025**
Includes: Tutorial Manual (070-7249-00); User Reference (070-7250-00); Programmer Ref. (070-7251-00); Command Ref. (070-7252-00); Service Reference (070-7254-00); Sub-miniature Probe Tip-to-BNC Adapter (013-0195-00); Power Cord, U.S., 120 V (161-0066-00).

DSA 602 Digitizing Signal Analyzer **$28,500**
Includes: Same as DSA 601.

INSTRUMENT OPTIONS

Opt.1C – Cable Feedthrough Connectors. **+$200**
Opt.1R – Rackmount **+$300**
Opt.3C – Acquisition Memory External Power Input. Provides plug for external power to acquisition memory. **+$150**
Opt.4C – Non-Volatile RAM. Adds over 450,000 points of nonvolatile storage **+$1,000**
Opt.2S – PEP 301 Instrument/System Controller **+$7,995**
Opt.1P – HC100 Four-Color Plotter **+$965**
Opt.3P – 4693DX Color Image Printer **+$8,995**
See page 67 for additional option information.

INTERNATIONAL POWER PLUG OPTIONS

Opt. A1-A5 Available **NC**
See page 488.

WARRANTY-PLUS **SERVICE PLAN OPTIONS**

See page 490.
DSA 601:
Opt.Q0 – On-site Product Installation and Setup **+$475**
Opt.Q1 – 1-Year On-Site Service **+$630**
Opt.Q2 – 2-Year On-Site Service **+$2,315**
Opt.Q3 – 3-Year On-Site Service **+$3,575**
DSA 602:
Opt.Q0 – On-site Product Installation and Setup **+$475**
Opt.Q1 – 1-Year On-Site Service **+$815**
Opt.Q2 – 2-Year On-Site Service **+$2,965**
Opt.Q3 – 3-Year On-Site Service **+$4,610**

ACCESSORIES

Blank Panel – See page 67.
Cables – See page 67.
Hard Copy Units – See page 67.
Recommended Cart – K217S.
Recommended Probes – See page 67.
Recommended Software – See page 67.

PHYSICAL CHARACTERISTICS

	Cabinet		Rackmount	
Dimensions	**mm**	**in.**	**mm**	**in.**
Width	457	18.0	482	19.0
Height	328	12.9	311	12.3
Depth	678	26.7	678	26.7
Weight ≈	**kg**	**lb**	**kg**	**lb**
Net				
DSA 601	30.4	67.0	36.3	80.0
DSA 602	32.2	71.0	38.1	84.0
Shipping (Domestic)	43.6	96.0	38.1	84.0

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