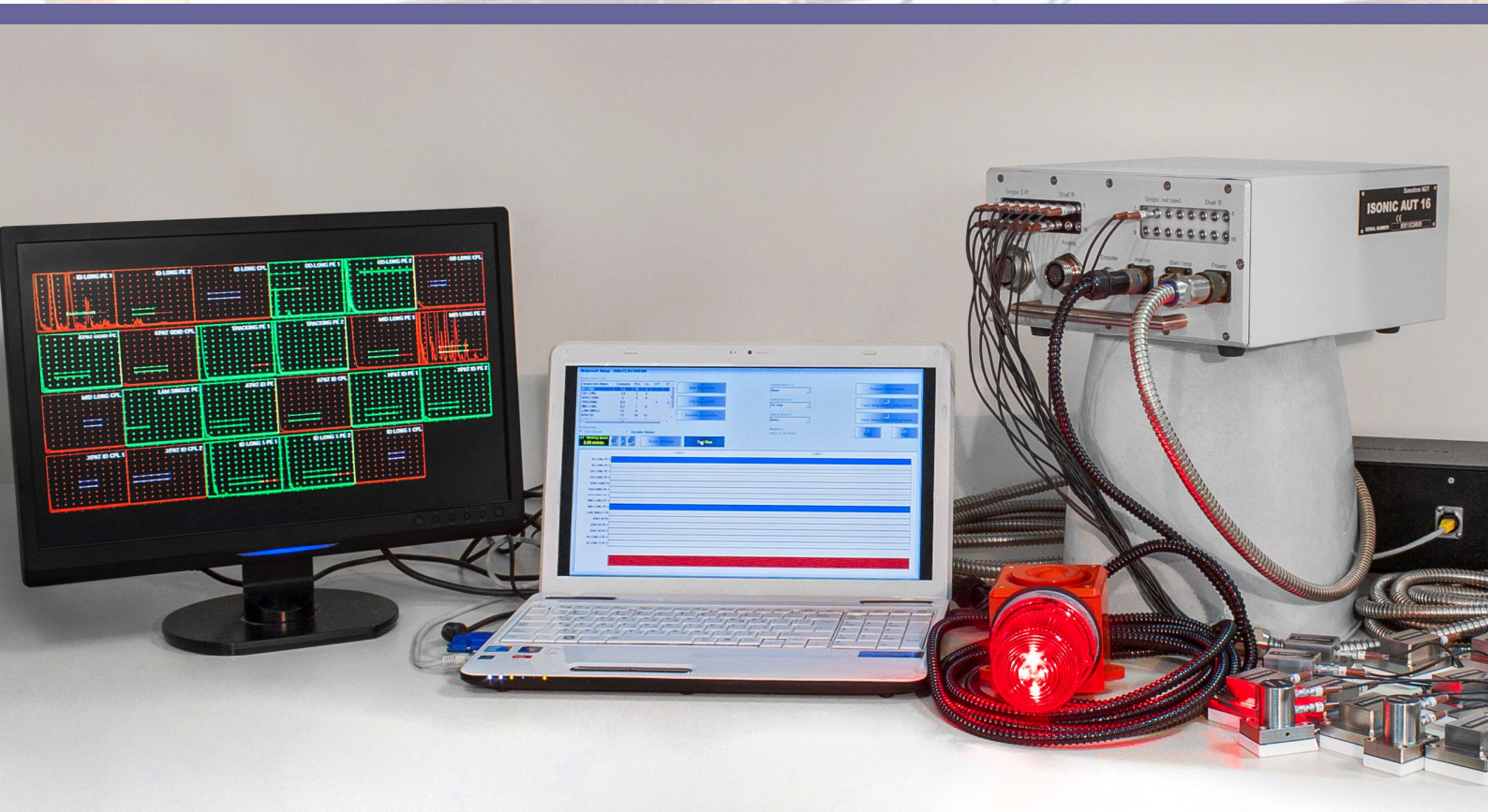
AdvancedNDT

ISONIC AUT 16/32

Multi-Channel Flaw Detectors for Automatic Ultrasonic Testing



Advanced Platform / Core Component for the High Speed AUT Machines and Process Monitoring Systems

SONOTRON NDT

4, Pekeris st., Rabin Science Park, Rehovot, 7670204, Israel
Phone: +972-(0)8-9311000, Fax: +972-(0)8-9477712
www.sonotronndt.com

ISONIC AUT 16 / 32 are portable multi-channel instruments designed for servicing as the core components of high-speed automatic ultrasonic testing (AUT) machines and process monitoring systems

ISONIC AUT 16 / 32 comprises 16 / 32 identical independently adjustable channels. Each channel comprising pulser, receiver, and 100 MHz sampling rate signal digitizer (A/D Converter) has 2 probe terminals to drive either single or dual element probe or probe pair. The highest scanning speed is achieved through the *parallel* pulsing, receiving, digitizing, and recording of signals by all channels in use. However in the case of cross-talking through the material is possible the instrument's channels may be toggled to work *sequentially* or organized into several groups of few channels working at parallel each (*combined* mode). The PRF of **up to 5 kHz per channel** is provided

Superior signal to noise ratio and dynamic range are achieved through firing probes with up to 400 Volt pp bi-polar square wave initial pulse. The duration and the amplitude of both positive and negative half-waves of the initial pulse are tuneable in the wide range. Further it is provided high stability of the firing amplitude selected by an operator within entire pulse width while the leading and falling edges of the bi-polar initial pulse are electronically boosted. Electronic damping circuit provides optimal amplitude / duration ratio for the received signals

Every channel is featured with 3 independent gates; beside regular functions the *Gain per Gate Adjustment* is possible for each gate – this allows implementing of pulse echo and back echo attenuation inspection techniques simultaneously, interface echo synchronizing, suppression of large geometry echoes, etc

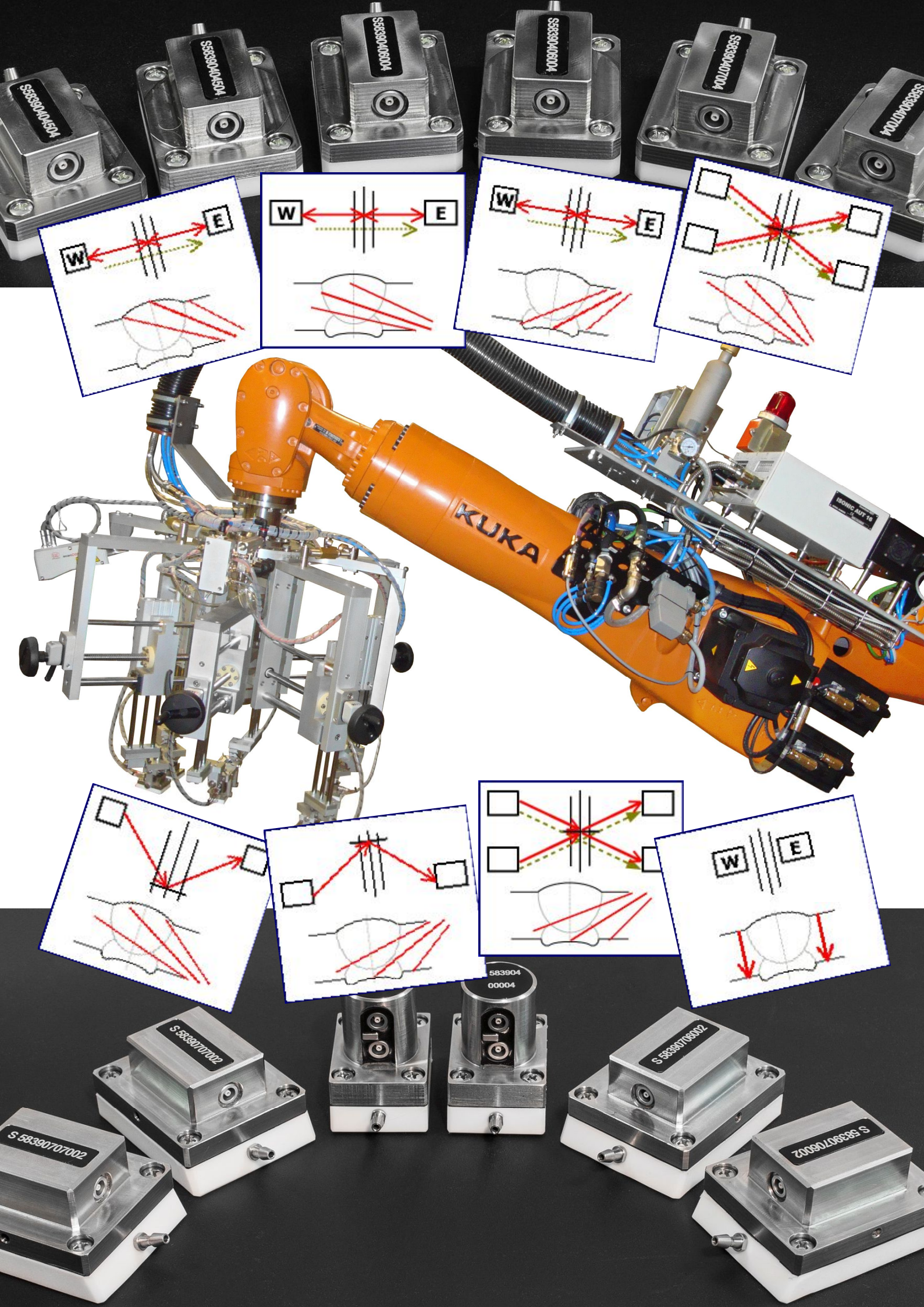
ISONIC AUT 16/32 electronics is also featured with:

- multi-axis encoder interface
- scanner motor control and powering interface
- interface for the external pedal and/or push-button "start/stop inspection" inputs
- user programmable lines for driving paint guns, audible alarm sirens, GO/NO-GO parts sorters, and the like
- user programmable proportional analogue outputs for the signal TOF / amplitude

The appropriate terminals are provided for any combination of the above external devices in accordance with the automation requirements

Scope of ultrasonic inspections performed by **ISONIC AUT 16/32** includes multi-channel thickness gauging, pulse echo, pitch-catch, and through-transmission flaw detection, TOFD, and the like. The instruments are packed into the rugged portable light weight IP 67-sealed cases, which may be either fitted into the scanner's chassis or mounted into a cabinet at the stationary inspection deck or just dropped onto the ground while in the field. A remote PC connected through LAN and appropriate inspection software package are required to control the instrument. The pre-scanning routine includes composing of multi-channel scanning strategy and automation logics followed by the calibrating of each channel involved. At the scanning stage the raw data comprising digitized ultrasonic signals and corresponding encoding information is streamed to the remote PC, which provides high-end processing, feedback to the instrument and external devices, imaging, logging, storage, etc. Fully digital control and data transfer allow practically unlimited distance between the instrument and remote PC enabling flexibility of creating control rooms or multiple monitor stations throughout the factory / hangar / weld station, etc

A variety of heavy duty probes for AUT are available along with **ISONIC AUT 16/32** instruments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Technical Data (Typical)

Number of Channels:	**16 - ISONIC AUT 16** **32 - ISONIC AUT 32**
Pulsing-Receiving:	**Parallel / Sequential / Combined**
Pulse Type:	**Bipolar Square Wave Pulse**
Initial Transition:	**≤ 5 ns (10-90%)**
Pulse Amplitude**:	**Smoothly tunable (12 levels) 75 V ... 400 V peak to peak into 50 Ω**
Pulse Duration*:	**50...600 ns for each half wave synchronously controllable in 10 ns step**
Modes*:	**Single / Dual**
PRF*:	**0 – optionally (external sync); 15...5000 Hz controllable in 1 Hz resolution;** **PRF per channel – up to 5 KHz**
Optional Sync Output / Input**:	**Max +5V, τ ≤ 5 ns, t ≥ 100 ns, Load Impedance ≥ 50 Ω**
Gain*:	**0...100 dB controllable in 0.5 dB resolution**
Advanced Low Noise Design:	**81 μV peak to peak input referred to 80 dB gain / 25 MHz bandwidth**
Frequency Band**:	**0.2 ... 25 MHz Wide Band**
A/D Conversion:	**Parallel 100 MHz 16 bit**
Digital Filter*:	**32-Taps FIR band pass with lower and upper frequency limits controllable with 0.1 MHz resolution**
Ultrasound Velocity*:	**300...20000 m/s (11.81...787.4 "/ms) controllable in 1 m/s (0.1 "/ms) resolution**
Range*:	**0.5...7000 μs controllable in 0.01 μs resolution**
Display Delay*:	**0...3200 μs controllable in 0.01 μs resolution**
Probe Angle*:	**0...90° controllable in 1° resolution**
Probe Delay*:	**0 to 100 μs controllable in 0.01 μs resolution - expandable**
Display Modes*:	**RF, Rectified (Full Wave / Negative or Positive Half Wave), Spectrum (FFT)**
Reject*:	**0...99 % of screen height controllable in 1% resolution**
DAC / TCG*:	**Theoretical – through keying in dB/mm (dB/") factor** **Experimental – through sequential recording echo amplitudes from variously distanced equal reflectors** **46 dB Dynamic Range, Slope ≤ 20 dB/μs, Capacity ≤ 40 points** **Available for Rectified and RF Display**
Gates*:	**3 Independent Gates / unlimitedly expandable**
Gate Start and Width*:	**Controllable over the whole variety of Display Delay and Range settings in 0.1 mm /// 0.001" resolution**
Gate Threshold*:	**5...95 % of A-Scan height controllable in 1 % resolution**
Gate per Gain Adjustment*:	**Independently controllable for each gate in 26 dB range with 0.5 dB resolution**
Encoder Interface:	**Built-in controller and interface for multi-axis incremental mechanical encoder**
Encoding:	**Time-based (built-in real time clock – 0.02 sec resolution) – line scanning** **True-to-position (single- and multi-axis incremental encoders) – line and area scanning**
Methods of Recording:	**Complete raw data recording** **Real time logging of the events / measurement results**
Off-Line Data Analysis:	**Recovery and play back of A-Scan sequence at various gain levels** **Echo-dynamic pattern analysis** **Defects sizing, outlining, pattern recognition** **Defect list** **Converting data into ASCII / MS Excel / MS Access / MS Word formats**
Real Time Hardware Outputs:	**Up to 67/134 independent user programmable digital lines (+24V or +9V logic) for controlling audible alarm sirens, paint guns, GO/NO-GO parts sorters – ISONIC AUT 16/32** **Up to 16/32 independent user programmable TOF /Amplitude proportional analogue output lines (0...5V) – ISONIC AUT 16/32**
Hardware Control Inputs:	**Up to 3 independent user programmable lines for the external pedal / push-button "Start/Stop Inspection" control**
On-Board Computer:	**AMD LX 800 - 500MHz Win XP Emb 1G RAM**
Internal CF Card (Quasi HDD):	**4 Gigabytes**
Interface:	**Ethernet**
Scanner Motor Interface:	**DC powering / RS 232 control - stepped motor**
Power:	**Mains - 100...240 VAC, 40...70 Hz, auto-switch**
Housing:	**IP 67 rugged aluminum case**
Dimensions:	**295×174×346mm (11.62"×6.85"×13.62")**
Weight:	**5.910 kg (13.00 lbs)**

* - controllable individually per channel
** - common for all channels

Advanced NDT Limited
Unit 4 Elgar Business Centre
Moseley Road
Hallow, Worcester
WR2 6NJ, England
Tel: 01905 371460

Web: www.advanced-ndt.co.uk
Email: sales@advanced-ndt.co.uk