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# УЛЬТРАЗВУКОВЫЕ ДЕФЕКТОСКОПЫ TORAZ64, QUARTZ, Z-SCAN-U

## ТЕХНИЧЕСКИЕ ХАРАКТЕРИСТИКИ

# QUARTZ

When speed matters.



# The Ideal Combination of Speed, Power and Flexibility

QuartZ is the latest member of Zetec's Ultrasonic Instruments product family. It is the answer to the requirements of complex and high-speed inspections. QuartZ is designed to perform in the harshest industrial environments without compromise.

QuartZ speed and robustness combined with UltraVision software legendary power and UltraVision Software Development Kit (SDK) flexibility offer the perfect solution for creating custom inspection solutions.

## Performance and Speed

**Parallel firing capability:** QuartZ supports 32:128 or 2x16:64 configurations, for two simultaneous apertures on one or two probes.

**High power phased array channels:** QuartZ incorporates real 100 V pulser for the phased array channels. Ideal for the inspection of very thick or difficult-to-penetrate materials.

**High data throughput:** QuartZ can deliver up to 30 MB/s of data throughput making the difference for demanding applications.

**Two powerful conventional UT channels:** A full inspection configuration of two PA probes and two UT probes only needs one simple instrument.

**Automatic probe detection:** When using Zetec probes, QuartZ automatically detects the probes connected ensuring the right probe is used and simplifying traceability up to the reporting process.

## The Most Advanced Inspection Features

**Time Reversal support:** Time Reversal allows the inspection of complex geometries and changing surfaces of composite materials by reducing the complexity of the mechanical scanners.

**UltraVision 3® controlled:** UltraVision 3 software performs all activities needed in an inspection process within the same package:

- Designing the probe and modelling the acoustic field;
- Defining the specimen, parts to inspect and scan plan;
- Calibration and inspection;
- Analysis and reporting.

All-in-one seamless integrated package.

## Scalable and Built to Last

**Integrated probe splitter:** For connecting two phased array probes without any additional accessories.

**Scalable:** Up to 10 QuartZ units in parallel controlled by the same UltraVision—almost no inspection configuration is too big.

**Easy integration:** Designed for integration, multiple QuartZ units can be synchronized in a simple cable configuration. Changing from tabletop to 19" rack mount configuration is as simple as adding the included mounting brackets.

**Made tough for tough environments:** QuartZ can be installed close to the probes, reducing cable length. No air conditioning is needed, saving on project complexity and installation costs.



# QuartZ Applications



## Manufacturing

Metal manufacturing requires providing high-quality parts for a very large range of applications. Cycle time minimization is critical for the optimization of production rates. QuartZ offers the right tools and scalability to address most applications.

## Tubes, Pipes and Plates

QuartZ allows creating the right solution for the inspection of tubes and pipes, plates or forgings. Inline and Offline applications are ideal for QuartZ easily creating a complex inspection configuration when required.



## Aerospace

The increasing use of composite parts that have complex and variable geometries creates inspection challenges.

Time Reversal is a real-time and adaptive technique that does not require knowledge of detailed component profiles.

QuartZ and Time Reversal together simplify the inspection process of complex composite parts for rapid and reliable PAUT inspections without the need of complex surface following mechanics or previous knowledge of the exact part shape.



## Transportation

Transportation industry is especially concerned by security. Train wheels, axles and rails need to be inspected at manufacturing or at regular intervals. QuartZ provides the tools for building the right solutions.



# Technical Specifications

<b>ULTRASONIC CONFIGURATION</b>	
Phased array channels	32:128 PR
PA firing modes	Up to 32 consecutive elements Up to 2 apertures of 16 consecutive elements
Phased array connector	2 x ZPAC connectors (custom ZIF with latch)
UT channels	2 channels (in Pulse/Echo or Pitch/Catch configurations)
<b>PULSER</b>	
Pulse width	25 ns to 500 ns
Pulse amplitude PA (at 50Ω)	35 V to 100 V
Pulse amplitude UT (at 50Ω)	50 V to 200 V
<b>DATA ACQUISITION</b>	
A-scan length	Up to 16,384 points
Maximum number of focal laws	1,024
Real-time averaging	1, 2, 4, 8 and 16
Compression	1, 2, 4, 8 and 16
PRF	20 kHz
Parallel firing	2 beams
Maximum number of samples	16,384
Measurement gates	4 gates + 1 synchronization gate
Data throughput	Up to 30 MB/s
Maximum data file	20 GB
Digitizing frequency	25 MHz, 50 MHz or 100 MHz
Bandwidth (at -3 dB)	500 kHz to 18 MHz
Summed data amplitude resolution	16 bits
Filters	Analog/digital band-pass, high-pass and low-pass
Gain setting range PA	100 dB
Gain setting range UT	94 dB
<b>INTERFACING</b>	
Data interfaces	Ethernet 1000Base-T
Encoder	2 axes (quadrature, clock direction)
<b>HOUSING</b>	
Size (H x W x D)	420 x 490 x 90 mm (16.5 x 19.3 x 3.5 in.)
Weight	8.34 kg
Air intake	No
Environmental protection	Designed for IP 65
<b>GENERAL SPECIFICATIONS</b>	
Voltage	120 VAC or 240 VAC
Frequency	50 Hz or 60 Hz
Maximum power	75 VA

# QuartZ – UltraVision and SDK

**UltraVision delivers the full power of QuartZ offering a 3D work environment with a high-speed and powerful solution.**

UltraVision allows preparing and implementing the full inspection process within the same software package, from the inspection design including ray tracing and beam simulation to calibration and inspection, advanced data management, assisted analysis and detailed reporting. One UltraVision session can control up to 10 QuartZ instruments for adding parallel power to the inspection configuration.

**UltraVision 3 SDK is a source code interface that gives access to the UltraVision main functionalities and that enables UltraVision customization:**

- Third parties can develop their tools/components that are incorporated inside UltraVision 3 software;
- Allows to go as far as removing most of the references to Zetec and UltraVision in the UI (User Interface) while Zetec UltraVision 3 engine is still running;
- Permits embedding customer features inside UltraVision;
- SDK supports C#, C++/CLI or VB .Net programming environments.





Easy mounting and simple cabling make Quartz the ideal building block for any integration project. Encoder signals are received by one unit and relayed to the others in a multi-instrument configuration. Military-grade connectors ensure signal quality and robustness in almost any environment.





# TOPAZ<sup>®</sup>64

Fully Integrated, Portable 64 Channel Phased Array UT Device

## ULTRA-INTELLIGENT ULTRASOUND

### Welcome to Ultra-Intelligent Ultrasound.

Introducing TOPAZ<sup>®</sup>64, a fully integrated, portable 64 channel Phased Array UT instrument delivering faster, more accurate inspections. It combines the power of 64 active channels for Phased Array UT applications, with the industry's most advanced FULL MATRIX CAPTURE (FMC) and TOTAL FOCUSING METHOD (TFM) capabilities. TOPAZ64 can intelligently handle all your challenging UT inspections using the latest technologies including:



- Full Matrix Capture (FMC)
- Real-Time High Resolution Total Focusing Method (TFM)
- 64 Channel Code-Compliant Phased Array Ultrasound (PAUT)
- Time of Flight Diffraction (TOFD)
- Time Reversal Technique (TR) Option

*Whether you are inspecting complex composite materials or thick welds, TOPAZ64 delivers better coverage.*

### Driven by Industrially Proven UltraVision<sup>®</sup> Software.



TOPAZ64 includes UltraVision Touch software onboard. This powerful, yet easy to use software controls the acquisition of Phased Array UT signals, displays real-time images and provides online and offline data analysis. UltraVision offers many advanced features for TOPAZ64 to improve Phased Array UT inspections, including industry leading FMC, real-time high resolution TFM, and post-processed TFM from recorded elementary A-Scan.

### Your Inspection Needs Covered, Challenges Met.

The highly flexible TOPAZ64 completes the TOPAZ family of portable integrated Phased Array ultrasonic instruments. From the unmatched value of TOPAZ16 and the redefined performance of TOPAZ32 to the ultra-intelligent TOPAZ64, you'll quickly agree your needs will be covered, challenges met.

# Smart Features

## TOPAZ64 is Packed With Features for an Inspection Advantage.

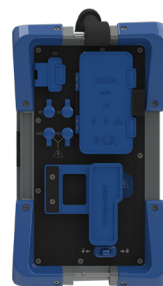
- **Experience the Power.** 64/128PR phased array configuration and 2 separate conventional UT channels at 200 V.
- **Higher Resolution, Better Performance.** Best-in-class “live” TFM resolution delivering 65k points frame, up to 110 Hz. When higher resolution is needed, TOPAZ64 can generate 1M points frame. No other portable instrument can match this resolution. The 12” high-resolution multi-touch display can be operated with gloves and delivers unmatched image quality.
- **Improve Probability of Detection.** New bipolar pulsers provide more energy to punch through thick components.
- **Save Time and Money.** Save raw A-Scan data for record-keeping compliance or TFM post-processing without the need to rescan.
- **Use Less Equipment.** Supports 2D matrix arrays in pulse echo, pitch & catch or multiprobe configurations without the need for any external software.
- **Use in Demanding Environments.** Rugged, lightweight casing with no air intake.
- **Increase Uptime, Wherever You Go.** Battery operated and designed to accommodate two batteries in a hot swappable sequential discharge configuration.



### Splitter Box Accessory \*

Connect two PA probes at the same time for dual probe weld inspection configurations. (ZPAC and Omni versions available)

\* Only available with 64/128PR version





# Specifications

Specifications in this document are subject to change

FEATURE	TOPAZ <sup>64</sup>
Size (H × W × D)	343 × 278 × 158 mm (13.5 × 10.9 × 6.2 in)
Weight (including one battery)	9.1kg (20.0 lb)
Multi-Touch Display	12.1 in. - 1024 x 728 pixels
Air Intake	No
Battery Operation	Yes
Phased Array Connector	ZPAC
Phased Array Channels	64/64P or 64/128PR
UT Channels	2 P/E or 2 P/C
Amplitude Resolution	16-bits
Measurement Gates	4 + 1 synchronization gate (peak, crossing, autocrossing)
Data Interfaces	Ethernet 1000 Base-T 1 x USB 3.0; 3 x USB 2.0
Maximum PRF	≤ 40 kHz
Data Compression	1, 2, 4, 8, 16
Max. Applied Voltage (50 ohms)	150Vpp PA UT (Bipolar) / 75V (Unipolar) / 200V UT
Bandwidth (-3 dB)	0.5 to 18 MHz PA 0.5 to 25 MHz UT
Rectification	Digital
Filtering	Analog / Digital (FIR)
Smoothing	Digital
Self-Check	Yes
Automated Probe Detection	Yes (with Zetec probe ID chip)
Automated Scanner Detection	Yes (with Zetec probe ID chip)
# Focal Laws	1024 with unlimited groups
TFM Frame Size	Up to 1M points
TFM Frame Rate	Up to 110 Hz (65k points frame resolution)
Maximum Number of Samples	16,384
Maximum Data File Size	2 GB ** Unlimited for raw A-Scan data
Encoder Interfaces	3 quadrature-type
Onboard Software	UltraVision Touch embedded
Serves as Protection Key	License for UltraVision Touch
Data Acquisition & Analysis (for remote data acquisition or off line postprocessing)	UltraVision Touch UltraVision 3
Embedded Hard Drive	256 GB SSD
Video Output	HDMI
Instrument Calibration	Compliant with ISO 18563-1 / EN 12668-1

## General Specifications

Voltage: 100 to 240 VAC

Frequency: 50 or 60 Hz

Maximum Power: 100 VA

Operating Temperature Range: -10°C to 45°C (14°F to 113°F)

Storage Temperature Range: -40°C to 70°C (-40°F to 158°F)

Relative Humidity: 80% non-condensing

CE mark is an attestation of the conformity with all applicable directives and standards of the European Community. The TOPAZ64 is an instrument of class 1 and installation category II.

Specifications included in this document are subject to change.

## Ordering Information

### 10056334 - ZPA-IUT-TOPAZ-64/64P

Fully integrated portable Phased Array system featuring up to 64 active channels on up to 64-element probe. This instrument can either use the same 64 transmitters and receivers or can be operated in PR mode using up to 32 channels as transmitters and 32 others as receivers for advanced inspections.

### 10056335 - ZPA-IUT-TOPAZ-64/64P-TFM

Fully integrated portable Phased Array system featuring up to 64 active channels on up to 64-element probe. This instrument can either use the same 64 transmitters and receivers or can be operated in PR mode using up to 32 channels as transmitters and 32 others as receivers for advanced inspections; 65K data points onboard, FMC/TFM capability.

### 10056328 - ZPA-IUT-TOPAZ-64/128PR

Fully integrated portable Phased Array system featuring up to 64 active channels on up to 128-element probe. This instrument can either use the same 64 transmitters and receivers or can be operated in PR mode using up to 64 channels as transmitters and 64 others as receivers for advanced inspections.

### 10056337 - ZPA-IUT-TOPAZ-64/128PR-TFM HR

Fully integrated portable Phased Array system featuring up to 64 active channels on up to 128-element probe. This instrument can either use the same 64 transmitters and receivers or can be operated in PR mode using up to 64 channels as transmitters and 64 others as receivers for advanced inspections, bipolar pulsers, 1M data points onboard, FMC/TFM capability.

## Environmental Tests

As per MIL-STD-810G

Cold Storage - 502.5 procedure I

Cold Operation - 502.5 procedure II

Heat Storage - 501.4 procedure I

Heat Operation - 501.4 procedure II

Temperature Shock - 503.5 procedure II

Vibration - 514.6 procedure I

Transit Drop - 516.6 procedure IV

Drop Test - IEC61010-1

## Accessories Ordering Information

### 10056344 – ZPA-ACC-SPLTBOX64-ZPAC-ZZPAC64+4UT

ZPAC SPLITTER for TOPAZ64 with fast easy attachment system including a solid security latch. It can manage ID data from 2 Phased Array probes allowing UltraVision to recognize them. It includes two pairs of Lemo connectors (individually isolated with switches) to convert 2 Phased Array channels into 2 conventional channels.

### 10056345 - ZPA-ACC-SPLTBOX64-ZPAC-ZOMNI64+4UT

Omni type SPLITTER for TOPAZ64 with fast easy attachment system including a solid security latch. The splitter includes two pairs of Lemo connectors (individually isolated with switches) to convert 2 Phased Array channels into 2 conventional channels.

### 10056338 - ZPA-IUT-TOPAZ-64/128PR-TFM HR-D

Fully integrated portable Phased Array system featuring up to 64 active channels on up to 128-element probe. This instrument can either use the same 64 transmitters and receivers or can be operated in PR mode using up to 64 channels as transmitters and 64 others as receivers for advanced inspections, bipolar pulsers, 1M data points onboard, FMC/TF.

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