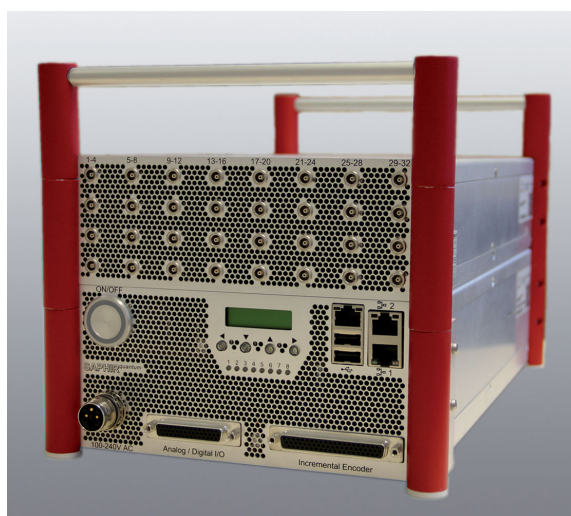


High End Parallel Phased Array Electronics for Challenging Applications

SAPHIR^{quantum} is a versatile high end ultrasonic testing (UT) system for phased array as well as for single- or parallel multi-channel applications in the UT non-destructive testing (NDT) field.

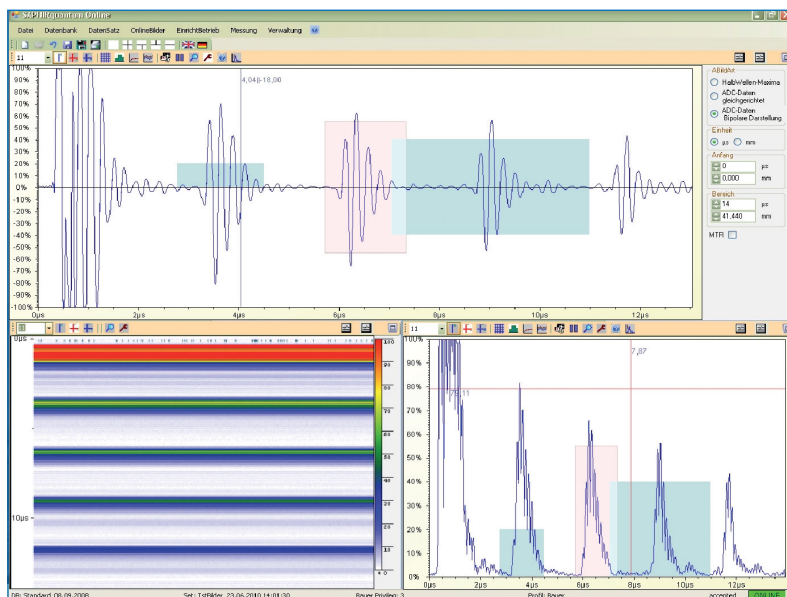


Example configuration: 32 channel system

SAPHIR^{quantum} in the basic design is equipped with 32 high resolution independently configurable channels for parallel or phased array application. The system is also cascable up to maximum 256 channels. The single channels are designed for flexible use in terms of application and have the same performances as known from high resolution board oriented parallel systems. The system is available in a portable version and in a 19" rack version, other housings on request.

Technical data 1	
General	
Number of channels	32 channel for line array, up to 256 channels per system 32 channel for phased array, up to 256 channels per system
Active channels	Any of 32 for line array free selectable, maximum 256 channels 32 for phased array, maximum 256 channels
Trigger	Internal/external trigger (maximum 20 kHz)/encoder interface
Cascaded operation	2 acquisition channels per box, up to 8 in total
Parallel operation	Up to 8 acquisition channels (boxes) with 32 elements each
Self-check system	Built in calibration box for full system check (optional)
Interfaces	
RF connectors	SJT 16 or Lemo 00
Data interface	Ethernet for online data transmission / parameterization
Trigger interface	Maximum 8 external encoders
Manipulator interface	Connector for manipulator control; Ethernet
Analogue I/O	4 input and 4 output ranges: +/- 10 V
Digital I/O	8 outputs RS485 level/8 inputs, differential RS485 level
Miscellaneous	
AC mains	100 V to 230 V, 50 Hz to 60 Hz Size (L x W x H) approximately
UT box	370 x 210 x 70 mm
Basic box	370 x 210 x 90 mm
Calibration box	370 x 210 x 70 mm
Weight approximately	UT box 3.6 kg, basic box 4.6 kg, calibration box 2.6 kg
Temperature range	+5° to 40°
Certifications	RoHS and CE

Your performance
is **our** everyday **commitment**



SAPHIR^{quantum} online data display linear array modus

SAPHIR^{quantum} offers a new generation of data acquisition and evaluation. The set-up and acquisition menu allows easy adjustments and instant verification of settings. The digital design is open to integrate customer-specific add-ons on request.

OEM Version

Fully implemented remote interface for OEM customers. Adaption of standard software (e.g. Labview™, Matlab™) or customer-specific software possible on request.

Technical data 2	
Data processing	
Sampling rate	Selectable 25/50/100 MHz/14 Bit for each channel
Interpolation	200 MHz and 500 MHz for pixel and i/k (ALOK) data
Averaging	2x to 8x
Averaging rate	100 MHz, 1 channel at a time
Evaluation window	2 trigger gates (entrance echo and back wall) 16 flaw gates (FB1 ... FB16) threshold selectable from 5 to 100% in 1% steps or 1.0 to 80 dB in 1 dB steps
Evaluation type	Each +, - or ±
Data reduction	
Trigger gate	Amplitude including time of flight of maxima or threshold
Data reduction algorithms	16 flaw gates Gateless data reduction (ALOK) RF data (A-Scan)

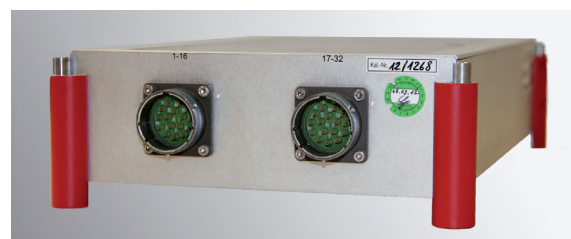
SAPHIR^{quantum} system calibration according to EN12668-1

SAPHIR^{quantum} can be easily equipped with a calibration module. This module provides a fully automated calibration of the system (once a year) according to EN12668-1 with a down-time which is in the range of hours.

The calibration of the UT device can be performed via remote access (upon request) or on-site by our service experts or in our Service Center in Karlstein.

The calibration of the calibration module is carried out in our Service Center in cooperation with our accredited Calibration Laboratory in Karlstein (accredited by DAkkS, German Accreditation Body).

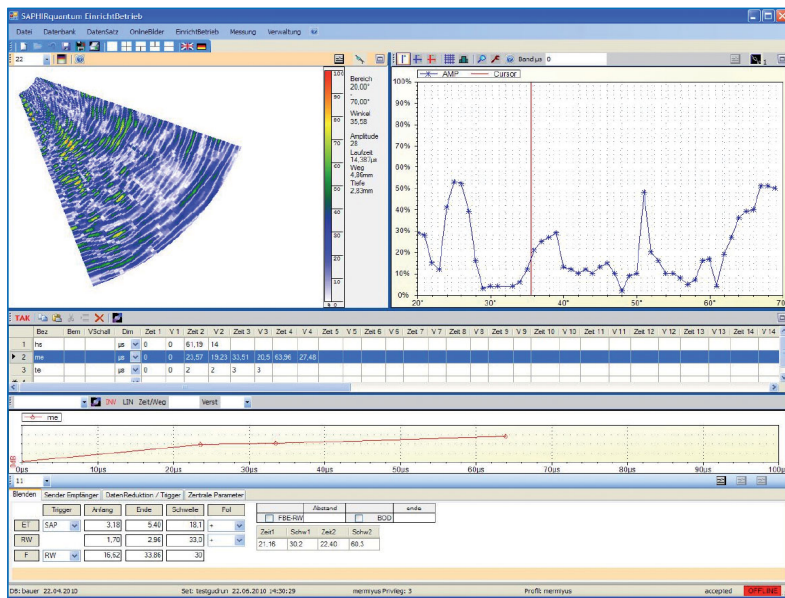
The visualization of the measurement results is done by special evaluation software which is integrated into the SAPHIR^{quantum} software.



SAPHIR^{quantum} calibration module

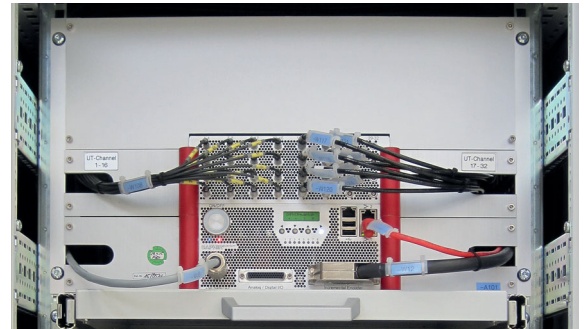
Customer benefit

- An automated fast self-check and calibration of all equipment functions in accordance with national codes and standards can be integrated in the SAPHIR^{quantum} UT system and can be performed per remote access worldwide



SAPHIR^{quantum} online data display – phasing modus

SAPHIR^{quantum} offers a new generation of flexibility in phased array applications and user-friendly set-up procedures. The fully PC-controlled parameter setting and storage is one of the main operator aids. SAPHIR^{quantum} is designed to operate just as well as an on-site inspection unit or as the integrated part of a complete automated inspection system.



SAPHIR^{quantum} mounted in air conditioned cabinet

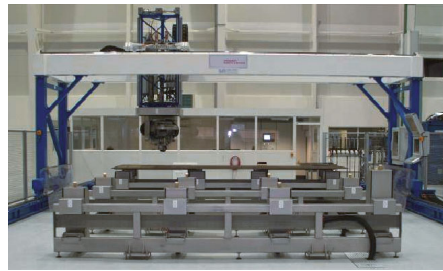
Technical data 3

Transmitter	
Pulse type	Negative square wave transmitter
Pulse width	20 to 1000 ns in 1 ns steps
Pulse amplitude	20 to 240 V at 50 Ω , selectable in 2-V-steps per channel
Rise time, fall time	≤ 10 ns
Dynamic pulse amplitude setting	Up to 30 V from pulse to pulse
Pulse repetition rate	Up to 20 kHz
Pulse shifting	0 to 100 μ s in 10 ns steps
Pulse delay for phased array	0 to 20 μ s in 1 ns steps
Output impedance	$Z_o \leq 10 \Omega$
Receiver / amplifier	
Receiver	Linear, overload protected (transmitter pulse)
Input amplitude	Maximum 3 Vpp (10 Vpp**optional)
Input impedance	50 Ω
Input dynamic range	≥ 100 dB with gain control
Input noise	< 3.0 nV/sqrt (Hz)
Receiver delay shifting	0 to 100 μ s in 10 ns steps
Linear amplifier, per channel	Analogue-amplifier: 0 to 80 dB in 0.25 dB steps Digital-amplifier: 0 to 20 dB in 0.25 dB steps Post-amplifier: 0 to 20 dB in 0.25 dB steps
Distance amplitude correction	0 to 100 dB, 0.25 dB step, slope maximum 40 dB/ μ s, 400 ns step
Analog bandwidth	0.3 to 30 MHz (-3 dB)
Filter (digital FIR)	Any applicable combination of HP and LP can be selected Wideband 0.3 to 30 MHz
High pass	0.3 – 0.5 – 0.9 – 1.2 – 2.0 – 2.5 – 2.9 MHz
Low pass	2.0 – 3.3 – 4.4 – 5.5 – 6.2 – 14.5 – 30.0 MHz
	Other frequencies on request

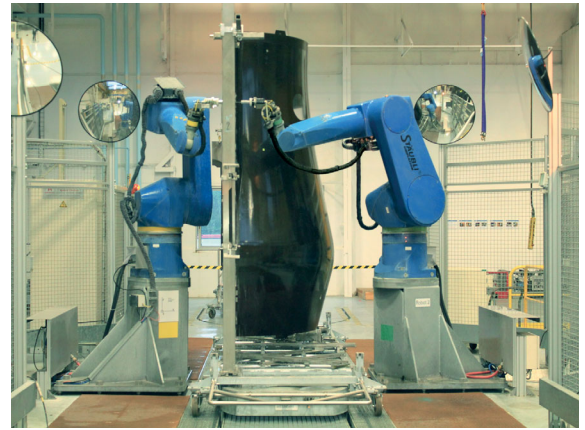
Application examples

Aerospace

Aircraft components build from carbon fiber composites. Complex 3D-scanning systems with several phased array transducers for fast and reliable inspection. Linear mechanics or robot based systems.



Linear mechanics with contact pulse-echo



Squirter twin robot

Steel turbine shafts

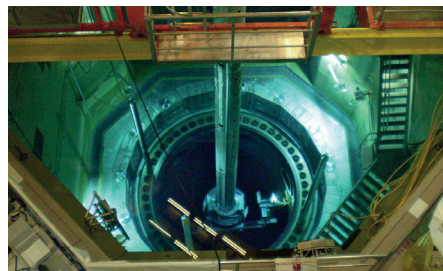
Turbine shafts, generator shafts, shaft modules e.g. shaft ends. Flexibility by roller support adjustable in height and advanced controls for conical parts and cavities.

Train wheel sets

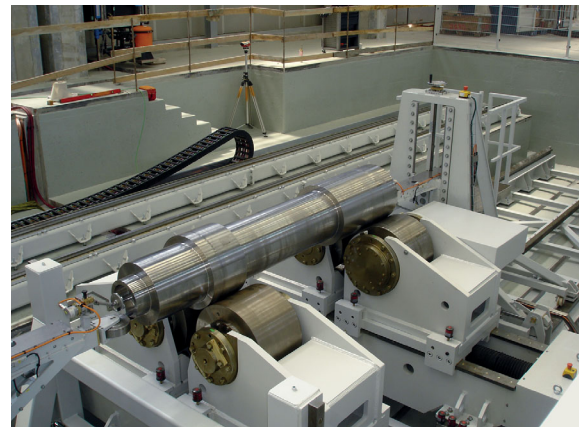
Underfloor wheel inspection, stationary train wheels, solid and hollow axles. Using advanced phased array technology for maximum reliability and safety.

OEM/reseller

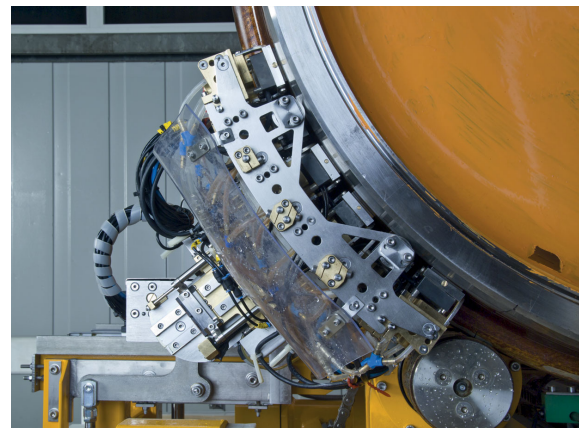
SAPHIR^{quantum} is available as stand-alone system for OEM partners and reseller as well.



In service inspections in nuclear and conventional power plants



Turbine shaft inspection



Wheel and axle inspection

Customer benefits

- Improved productivity through different inspection configurations:
 - Automated and manual inspection
 - Parallel architecture for high speed data processing
 - Phased Array and conventional probes simultaneously
- Excellent stability and reliability for maximized up-time
- Future proof with high flexibility and modular extensions
- Outstanding performances and quality

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