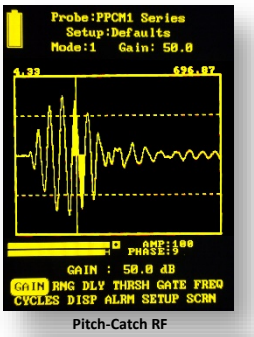
BondaScope 3100

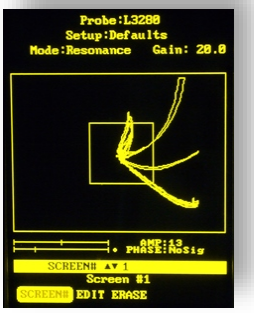
MULTIMODE COMPOSITE BOND TESTER

NDT Systems
Worldwide Excellence In Ultrasonics



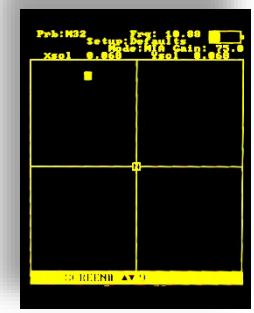
Pitch-Catch RF

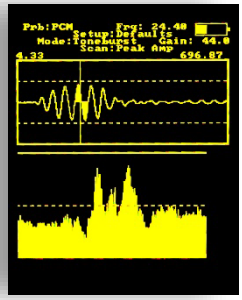
MIA Swept



Resonance

Multiple Gates


Profile Display



Flying Dot

Introduction

The Bondascope 3100 is an advanced ultrasonic bond tester that uses 3 different operating modes to cover a multitude of applications. Compared to conventional UT, the lower frequencies of 20 kHz-400 kHz enable deeper penetration through attenuative materials, across multiple glue lines or even sandwich cores to detect far-side defects. The various display modes are optimized for different applications with a selection of gates and alarms to easily identify a flaw.

The Pitch-catch and Resonance modes are suited to laminates, bonded and sandwich structures. Pitch-Catch is dry coupled, easy to use and works well on larger defects. Resonance mode requires couplant, but can identify smaller defects and even determine which layer the defect occurred in with multi-layered bonded structures. The MIA mode is dry-coupled and most suited to stiffer skin to core constructions.

Key features

- Operating modes: Resonance, Pitch-Catch, Mechanical Impedance (MIA)
- Display modes: RF, Impedance plane, Flying dot, Sweep, time-encoded profile
- Pulser modes: Tone burst, high energy pulsed mode, swept frequency
- Automatic Probe recognition and appropriate probe library per probe
- Programmable visual and auditable alarms
- Programmable user setups

Applications

- Integrity of honeycomb or foam cored composites
- Adhesively bonded metal-to-metal structures and fittings
- Multi-layered glass or carbon fiber laminates
- Causes for defects can be manufacturing process or service/repair imperfections, material stress and fatigue, material temperature/pressure/humidity exposure, impact damage, etc.
- Nature of defects detectable are delaminations, disbonds, crushed core, skin-to-core flaws, far-side defects, impact damage, liquid ingress
- If used in conjunction with the *BondHub**, 3D or C-Scan imaging can be performed on any of the above listed applications

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Inspection methods

When a probe is connected to the Bondascope 3100, the automatic recognition optimizes the settings for the probe type. There are 6 inspection methods available.

Pitch-Catch | RF: Transmits a short burst of acoustic energy into the part and measures the amplitude and phase change of the received signal. A disbond reduces material integrity and thus sound attenuation within the part leading to a higher amplitude at the receiver tip of the probe.

Pitch-Catch | Pulsed: Transmits a spike pulse of broadband acoustic energy into the part and measures the amplitude of the received signal.

Pitch-Catch | Swept: Transmits a short burst of acoustic energy of a pre-defined swept frequency range to the part. The system measures and shows the amplitude and phase change of the received signal.

MIA | Fixed Frequency: Probe tip driven at fixed frequency. Receiver, mechanically coupled to tip, measures the changes in probe loading across the part showing amplitude and phase change. Probe loading is related to the stiffness of the bond.

MIA | Swept Frequency: Probe tip driven with a swept frequency. Receiver, mechanically coupled to tip, measures the changes in probe loading across the part showing amplitude and phase change.

Resonance: Probe driven at the resonance frequency - damping caused by contact with the part is analyzed. Defects are identified by a change of signal phase and amplitude of the probe resonance caused by a change in acoustic impedance of the part.

Results can be displayed in different modes including live RF envelope or impedance plane display. The Impedance-plane display (flying dot or swept) is a polar coordinate system showing the phase shift and amplitude of the test area compared to a nulled out good bond. A time-encoded profile of phase and amplitude can also be used for rapid scanning.

Technical Specifications

General	Package	Bondascope 3100 unit, Li-Ion battery, AC charger (110-240V), User manual, COC, Pelican Case		
	Display	240 x 320 pixels, quarter-VGA, 5.7"(14.4mm) diagonal EL		
	Dimensions	5.75in x 9.5in x 3.0in, 5lbs | 146mm x 241mm x 76mm, 2.27kg		
	Power source	Field-replaceable Li-ion battery (autonomy = 8 hours) or AC power		
	Operating temp	32 F - 105 F (0 °C to 40 °C)		
	Storage temp	-4 F - 140 F (-20 °C to 60 °C)		
	Connector type	Standard 11-pin Fischer & 8-pin Lemo (compatible with probes of other manufacturers)		
	Connectivity	USB connector for Data transfer to a PC		
	Storage	100 setups and 250 screens with real-time date and time stamp		
Probe	Type	Pitch-Catch (tone burst, pulsed & swept frequency) | MIA (fixed & swept frequency) | Resonance		
	Frequency	250Hz - 1.5MHz (probe and setup specific) | adjustable frequency, adjustable cycles		
Gates	Type	Up to 8 independent rectangular, elliptical or circular shaped gates in impedance plane mode		
	Display Modes	RF, Impedance plane (flying dot, swept mode), Profile mode		
Probe types		Pitch-Catch: Spring loaded or fixed tips Tone burst or pulsed and high voltage option Low, medium or high frequency	Mechanical Impedance: 1/4", 3/8", 1/2" tip dia (6.35mm, 9.53mm, 12.70mm)	Resonance: Standard- 110kHz, 165kHz, 200kHz, 250kHz, 280kHz, 330 kHz, 370 kHz. Honeycomb- 18kHz, 26kHz, 53kHz

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