

## Scanning acoustic microscopes

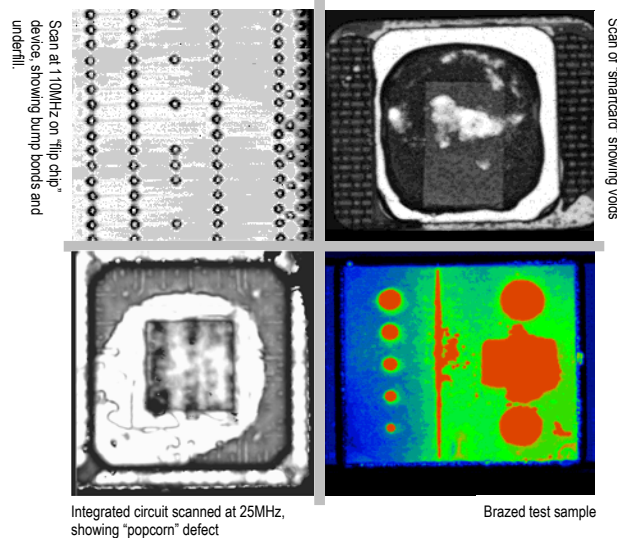


ICAM system



Typical SAM350 configuration

- High resolution ultrasonic imaging for industry, research, medicine and education
- System configurations to suit a wide range of parts



Scan at 10MHz on "flip chip" device, showing bump bonds and underfill.

Scan of "smartcard" showing voids

Integrated circuit scanned at 25MHz, showing "popcorn" defect

Brazed test sample

USL offers a range of scanning acoustic microscopes (SAM) to suit a wide variety of samples and parts. The first USL SAM system was installed over 18 years ago and current equipment takes advantage of USL's continuous development in mechanical scanners, electronics and software.

The SAM350 system is used in areas as diverse as material development, medical research and semiconductor manufacture. The immersion tank can take large samples so that detailed nondestructive examination can be performed on engineering products, for example.

The ICAM system was specifically designed for integrated circuit and semiconductor applications, where

large Z axis travel is unnecessary, but it is also suitable for other parts which are typically less than 25mms thick.

In this unit, very high scanning speeds can be achieved because of a unique mechanical design, coupled with custom digital signal processing electronics.

Volumetric features as small as 30 micrometres can be imaged at 50MHz - eg inclusions and voids in metallic or ceramic materials. The software includes sophisticated routines such as "Volume Scan". This enables full RF waveforms to be stored for processing later, when multiple C scan and B scan images can be produced.

Special configurations can be produced to suit individual customer requirements—for example units with irrigated probes rather than total immersion.

## ICAM and SAM350 comparative specifications

	ICAM	SAM350
<b>SCANNER</b>		
Scan area (X,Y)	350 x 250mm	350 x 350mm
Z axis travel	50mm	200mm
Tank size	380 x 290 x 50mm	630 x 570 x 300mm
Resolution	0.005mm	0.0125mm
Scanning speed	Up to 3 metres/sec (15 lines per second at 25x25mm scan size)	50mm/sec (1-2 lines per second at 25x25 mm scan size)
Drive system	DC motors and ball- screws. Encoders for closed loop control	Stepper motors and ballscrews. (Encoders optional at extra cost)
<b>MOTOR DRIVE</b>		
Type	Integated Baldor / PMAC DC motor drive	Separate 3 axis stepper motor drive unit
<b>COMPUTER</b>		
CPU	Pentium 2.8GHz	
RAM	512Mbyte	
Storage	HDU 160Gbyte min, read/write CD/DVD drive	
Graphics	SVGA 1024 x 768 x 256 colours 21" LCD monitor	
<b>ULTRASONICS</b>		
Pulser receiver	USL PR20 and PR50 standard, or external higher frequency	USL PR20 or PR50 (Second PR is optional)
Pulser	Spike and square wave pulse 0 - 600V	PR20 Square wave PR50 Spike pulse 0-600V
Frequency range	15 - 75MHz standard Up to 400MHz optional	PR20 1 - 25MHz PR50 15 - 75MHz
Gain	63dB in standard unit	
Mode	Pulse echo and pitch catch	Pulse echo standard. Pitch catch optional
<b>DATA ACQUISITION</b>		
A - D board	Up to 2GHz depending on application	
Digital Signal Processing	USL DSP100 or software processing	
Monitor Gates	Amplitude, time and phase	Amplitude and time
Number of gates	8 simultaneous	
Gate trigger	Main bang and interface	
Gate resolution	10 nanosecs at 100MHz 1 nanosec at 1GHz	

	ICAM	SAM350
<b>SOFTWARE</b>		
RF/A scan display	Update rate 15/20Hz, user selectable window Continuously variable delay and timebase	
Features	Display of multiple image files C scan and B scan modes Menu control of all functions Motion control utilities Joystick axis control Palette selection and user editing On screen measurements Image zoom, pan and scroll Full RF acquisition and processing - "Volume Scan" Step and repeat or multiple scan areas	
Imaging modes	A, B and C scan Step and repeat multi view Pulse echo and through transmission	A, B and C scan Pulse echo and double through transmission
<b>TRANSDUCERS</b>		
Standard supply	25 and 50 MHz, PVdF Through transmission receiver	25 and 50 MHz, PVdF
Optional	75 MHz 15MHz Others up to 125MHz	From 0.5 to 50MHz, depending on application
<b>PRINTER</b>		
Type	A4 inkjet standard. A3 and colour laser optional	
<b>OPTIONAL ITEMS</b>		
Mechanical	Operator desk unit	Turntables (200 and 300mm diameter) Other rotary scanners Probe manipulator
Ultrasonics	Pulser receivers with external Pulser preamplifiers up to 400MHz	
Data acquisition	Standard 100MHz A-D converter and DSP can be replaced by A-D converters up to 2GHz single shot	
Software	Special software options can be provided at customer request—for example inclusion assessment to customer specification.	
<b>PHYSICAL</b>		
Overall size	Scanner and electronic module 600x600x1500mm (WxDxH) Includes computer, but excludes monitor	Scanner 750x820x700mm (WxDxH) Electronic modules 2@600x600x150mm. Excludes computer and monitor
Weight	280kgs total	Scanner 90kgs
Power	110/220/240 Single phase, 13A	110/220/240 Single phase, 13A

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