RoBAT

RXI Test System Data Sheet

RoBAT RXI System Specification Issue 10

1 INTRODUCTION

Vertical 2-headed backplane test system. Completely automated AOI and X-Ray test.
RoBAT has a firm commitment to ongoing development, and will release additional functions and features from time-to-time.

2 BACKPLANE SIZE

Maximum backplane size accommodated is:

X (horizontal) direction	- up to 650mm (25.5")
Y (vertical) direction	- up to 1000mm (39")

An optional indexing system is available to increase the maximum height of board that can be tested to 1400mm (55"). This is a hardware option the moves the backplane under test upwards by 400 mm when given the appropriate signal from the test programme. It consists of a modified mounting frame, a pair of pneumatic cylinders and associated controls. It operates under software control.

A further option extends the length of the machine so that a board of width 1000mm can be tested. *See Section 10 for more details.*

3 COMPUTER SYSTEM (PC)

LGA1155 Motherboard
Intel i7 LGA1155 3.4GHz Processor
16Gb DDR3 1333MHz Memory
1Tb SATA 6Gb/s HDD 7200RPM 32MB Cache + 240GB Kingston SSD
HD 2GB GDDR3 VGA graphics card
22X DVD±RW serial ATA drive
1Gbit Ethernet
Keyboard
Mouse
24" 1920x1080 Monitor (x2)
Thermal printer

The PC specification on delivery may be upgraded without notice.

4 MOTION SYSTEMS

Machine is double sided with identical motion function on both sides. The motion system consists of four air bearing linear stepper motors for X and X axis control plus two rotary stepper motors for the Z axes. These motors are controlled by a six-axis motion controller board.

Parameter	X and Y Axes	Z Axis
Positional Resolution	16µm	7.5µm
Maximum Head Speed	$0.6ms^{-1}$	$0.1ms^{-1}$
Positional accuracy	±50µm	±50µm

Z axis example movement times:

For full travel:	1.88 seconds for 144mm
10mm move for insertion:	0.206 seconds for 10mm
Tool engagement time:	Typically less than 0.5 seconds

5 MACHINE X-RAY HARDWARE

The system is supplied with a micro-focus X-ray source with 60kV maximum electron energy. It is closed metal ceramic tube with reflective grounded tungsten anode and 300µm beryllium window. The electron energy, emission current and focal spot sizes are software programmable on an image-by-image basis

Parameter	60kV Source
Electron energy	20 - 60kV
Emission current (programmable)	0.1 - 1.2 mA
Fonal spot diameter (programmable)	20 - 50 µm
X-Ray cone angle	42°
Intensity stability	0.2% over 4 hours
Focal spot position stability	±1µm over 8 hours
Fonal spot diameter stability	±1µm over 8 hours
Maximum focal spot power loading	0.175 W/ µm²
Maximum supply output power	100W

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5 MACHINE X-RAY HARDWARE (cont.)

The maximum output power of the X-ray tube (electron energy multiplied by the emission current) is determined by the heat loading on the anode focal spot. For a 20µm diameter focal spot this corresponds to 55W.

The system is supplied with a high resolution X-ray imaging camera system with the following features:

Parameter	Value
Scintillator field of view	24mm x 16mm
Image pixels	4032 x 2688
Pixel size	9µm square
Effective resolution	15 lpmm
Image digitisation	12 bit
On clip sample binning	1x1 , 4x4 , 8x8 user programmable
Dynamic range (unbinned)	63536
Dark current	5 electrons / pixel / sec

Software adjustable exposure time, on chip gain, and on chip binning on an image-by-image basis.

The system enclosure is shielded to protect the operators from exposure to ionising radiation. The equivilent dose rate is less than 1µSv/hour at the enclosure walls.

6 VISION SYSTEM

The vision system consists of the following main components:

2 x Progressive-scan colour GigE Vision 2454 x 2056 pixel cameras synchronised with the motion system

8 x LED lighting modules

2 x 54mm x 45mm field of view, fully telecentric (0.05 degree error) lens with very low distortion (0.03% typical error) and very high resolution (70 line pairs per mm 50% CTF)

This provides the following key features:

- Automatic camera focussing & ambient light compensation
- Variable intensity lighting
- AOI testing
- Bent pin scanning
- Pattern locate (absolute or referencing to nearby landmark)
- Barcode reading - serial numbers can be used as a board data reference

All images are stored under the backplane serial number.

7 OPERATING SOFTWARE

Windows 7 Professional Operating System
RoBAT RXI Version 1.5.2 (or higher) Software including:

- Machine controller and test sequencer
- Machine Calibration and self-test
- Colour AOI/Bent pin testing
- Bent or missing pin detection.

  The standard deviation of the returned pin position is <10µm relative to a connector average pin position datum. This corresponds to a ±3s reproducibility of ±25µm

- Fully automated X-ray image acquisition and processing within and automatic test sequence.
- Drivers and diagnostics (where available) for all supplied hardware

Programming tools:

- Data import from Drill File/Netlist, IPC File, ODB++, Neutral File
- Where IPC356 (containing test point names) or a CAD neutral file is available this process is significantly automated.
- Defining the sequence of AOI Tests, AXI Tests
- Automated board frame design

General facilities provided are:

- Self test software
- Manual machine operation
- Test record kept for each tested backplane with ticket printer
- Failure retest program generation

8 INSTALLATION REQUIREMENTS

Area for machine:

- Height 2510 mm
- Width 2,600 mm
- Depth 3250 mm
- Weight 2100 Kg

Power requirements: 230V ac 50 Hz, 16A (S type breaker)

Compressed air: 6 bar minimum required flow 80 l/min

9 ENVIRONMENT (OPERATION & STORAGE)

Storage / Transportation:

Temperature : -10°C to 60°C
Relative Humidity: 90% or less (non condensing)

Operation:

Temperature: 0°C to 35°C
Relative Humidity: 75% or less (non condensing)

10 OPTION - BOARD INDEXING

Board indexing is a hardware option that indexes the backplane under test upwards by 400 mm when given the appropriate signal from the test program.

It consists of a modified mounting frame, a pair of pneumatic cylinders and associated controls. It operates under software control.

This option effectively increases maximum height of board that can be tested to 1400mm (55”).

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