Retrieving Data from the SCT Database

A Java Graphical User Interface

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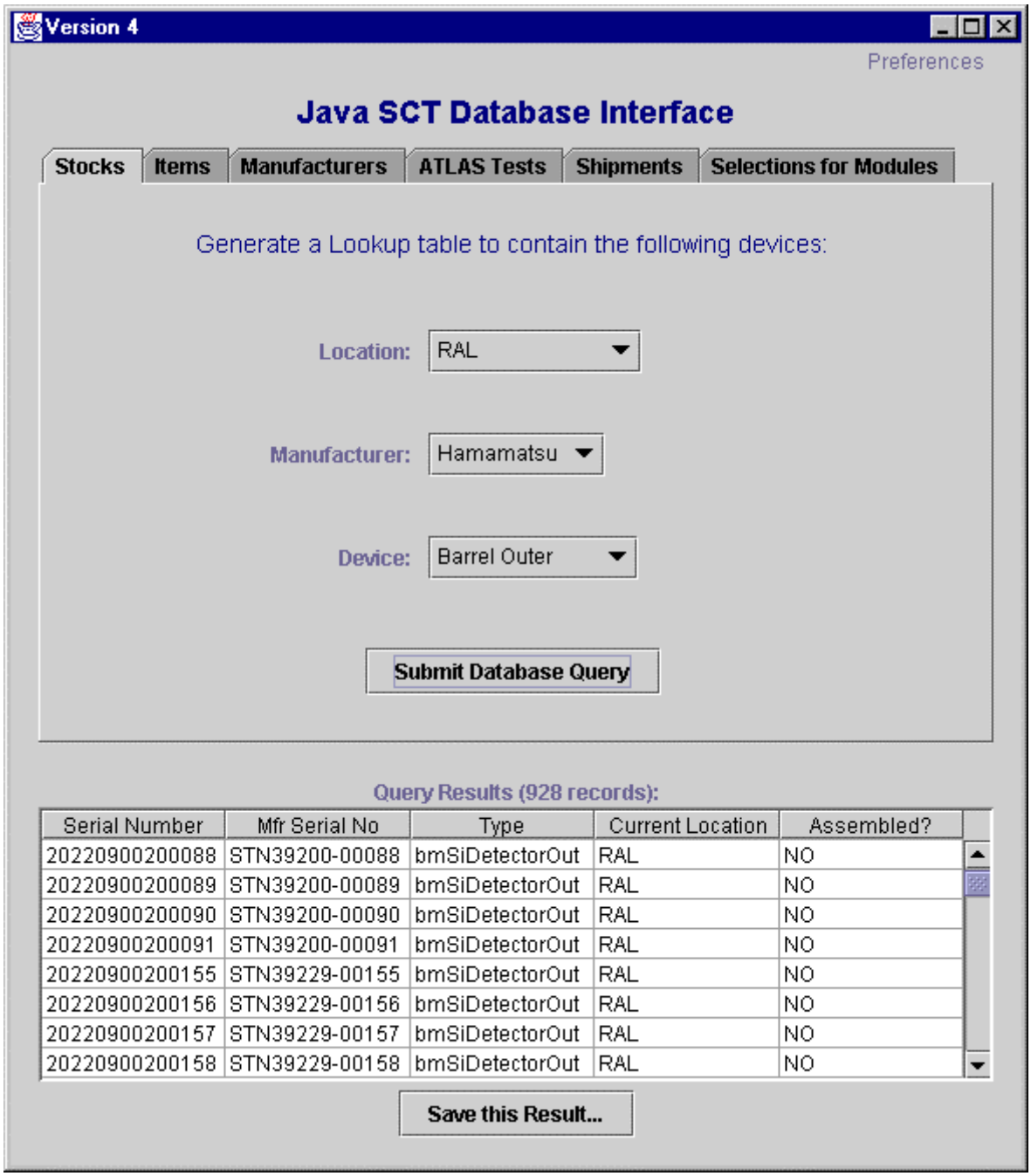
- Standalone application written in Java
- Runs on most platforms (eg Windows, Linux, Mac...)
- Fast, powerful and flexible report generator
- Developed to meet the needs of the SCT detector community and to provide a detector interface for the SCT modules communities
- Provides a GUI to define a query
  - submits SQL queries direct to SCT database
  - presentation of results depends on nature of query
    - spreadsheets (eg Excel or equivalent)
    - HTML reports
    - raw data lists
    - images
- Trivial to install and run
- Available now!

This talk is available as a PDF file from www.hep.phy.cam.ac.uk/silicon (menu item Talks/Presentations)

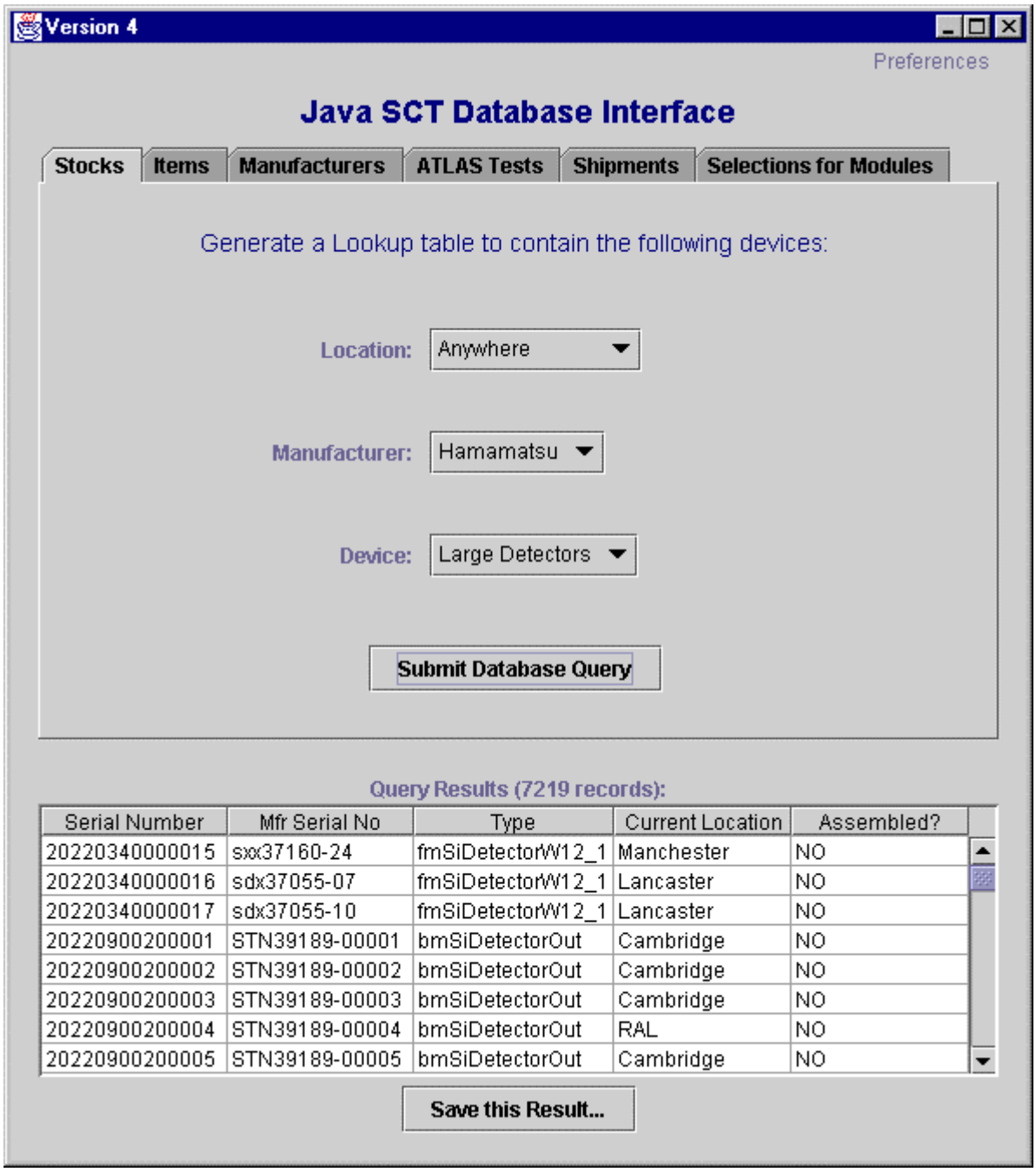
A Simple Query

eg request a listing of all barrel detectors at RAL:

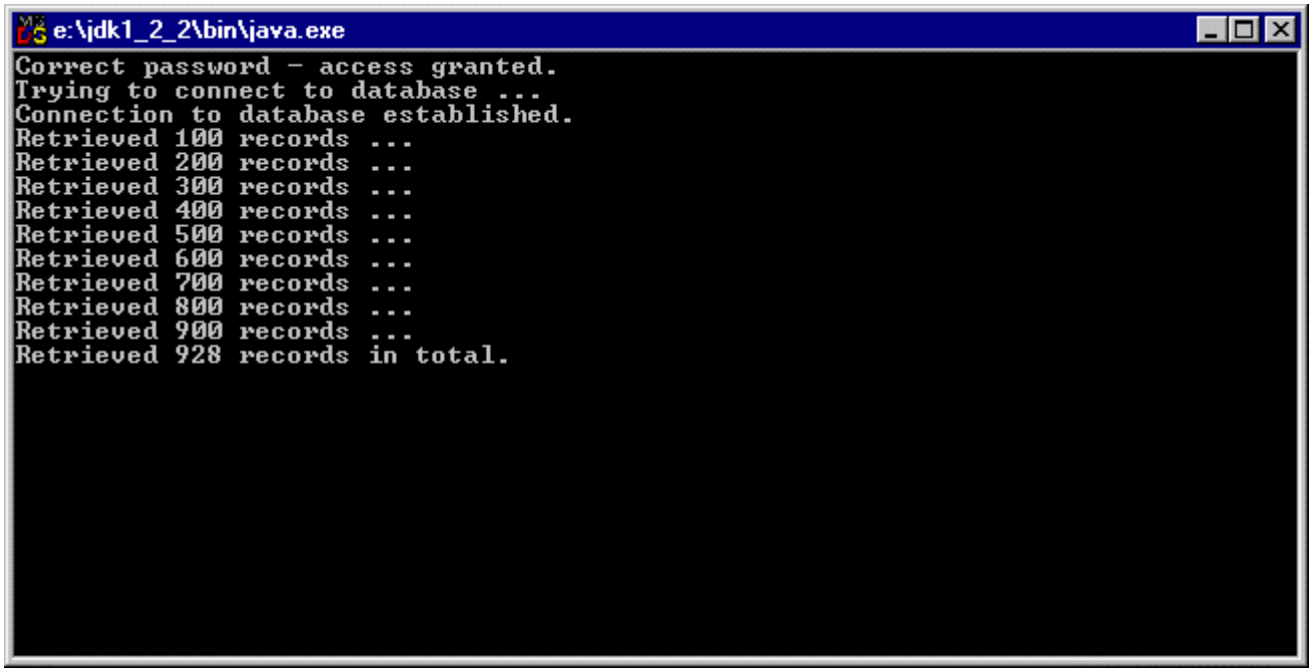


A more general ‘Stocks’ query:

List all detectors supplied by Hamamatsu



During data retrieval the status of the SQL query can be viewed in the DOS window (or console if not running Windows):



Data retrieval is fast - typically 4-5 seconds to generate a simple spreadsheet (like this one) of nearly 1000 records.

In its present form the GUI provides five general categories of query:

- **Stocks**
  Simple list of items at a given institute

- **Items**
  Reports on a single device,
  eg location, shipment history, test history, full test report

- **Manufacturers**
  Reports of manufacturer's data, and raw data listings

- **ATLAS Tests**
  Reports on ATLAS QA tests
  Eg: test results, comparisons with manufacturer data, testing status, raw data listings, test images

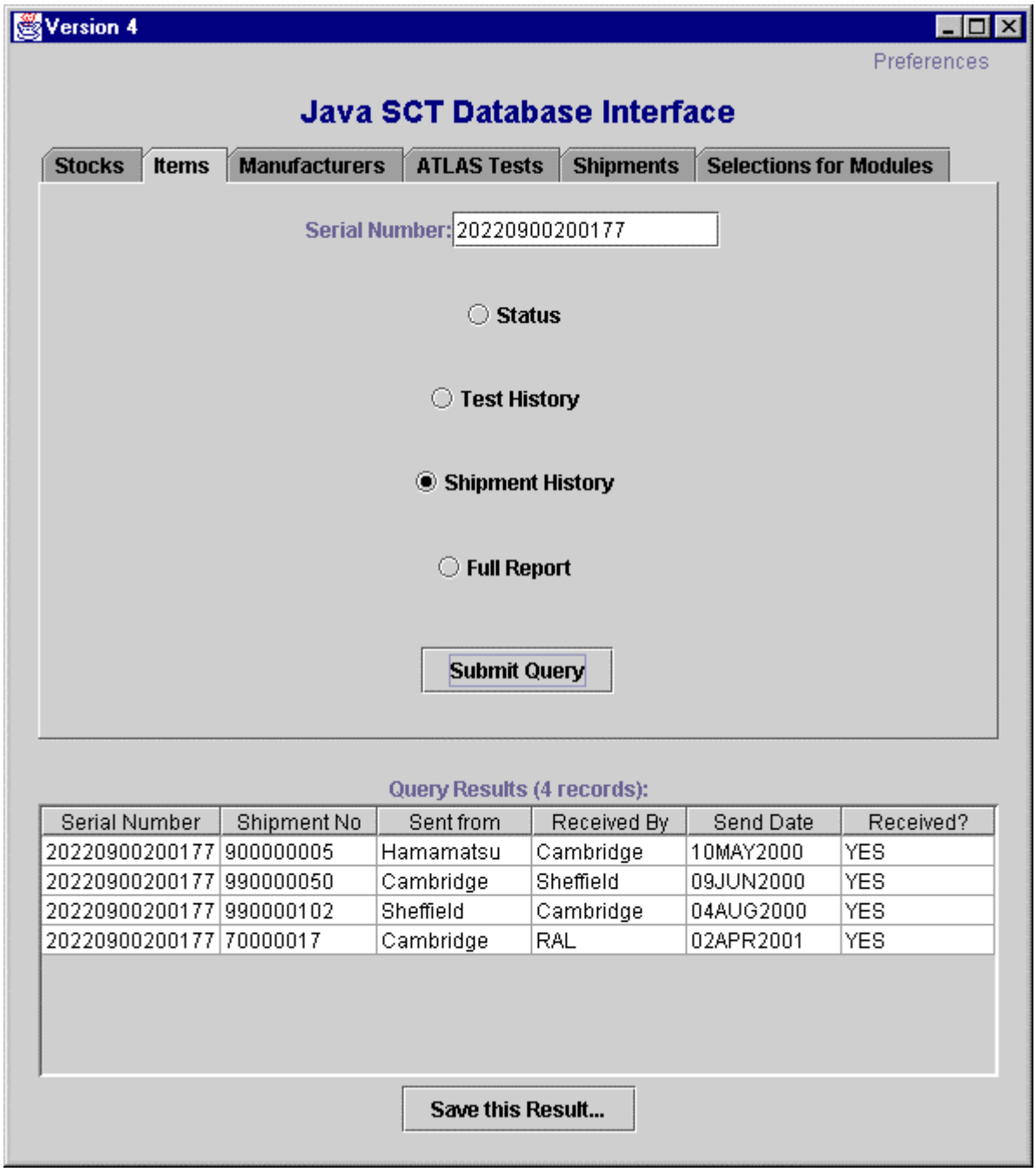
- **Shipments**
  Reports of shipments between any manufacturer or institute to another manufacturer/institute, *and for each shipment: lists of items, test status of items, test results, raw data, test images etc*

- **Selections for Modules**
  Lists of assembled devices available for assembly at a given institute, filtered according to requested level of detector quality. Assignments of detectors to modules, generation of assignment reports and database files

The GUI offers a high level of flexibility, and availability of reports follows a "tree-like" structure

Example of Items Query:

Shipment history of a detector



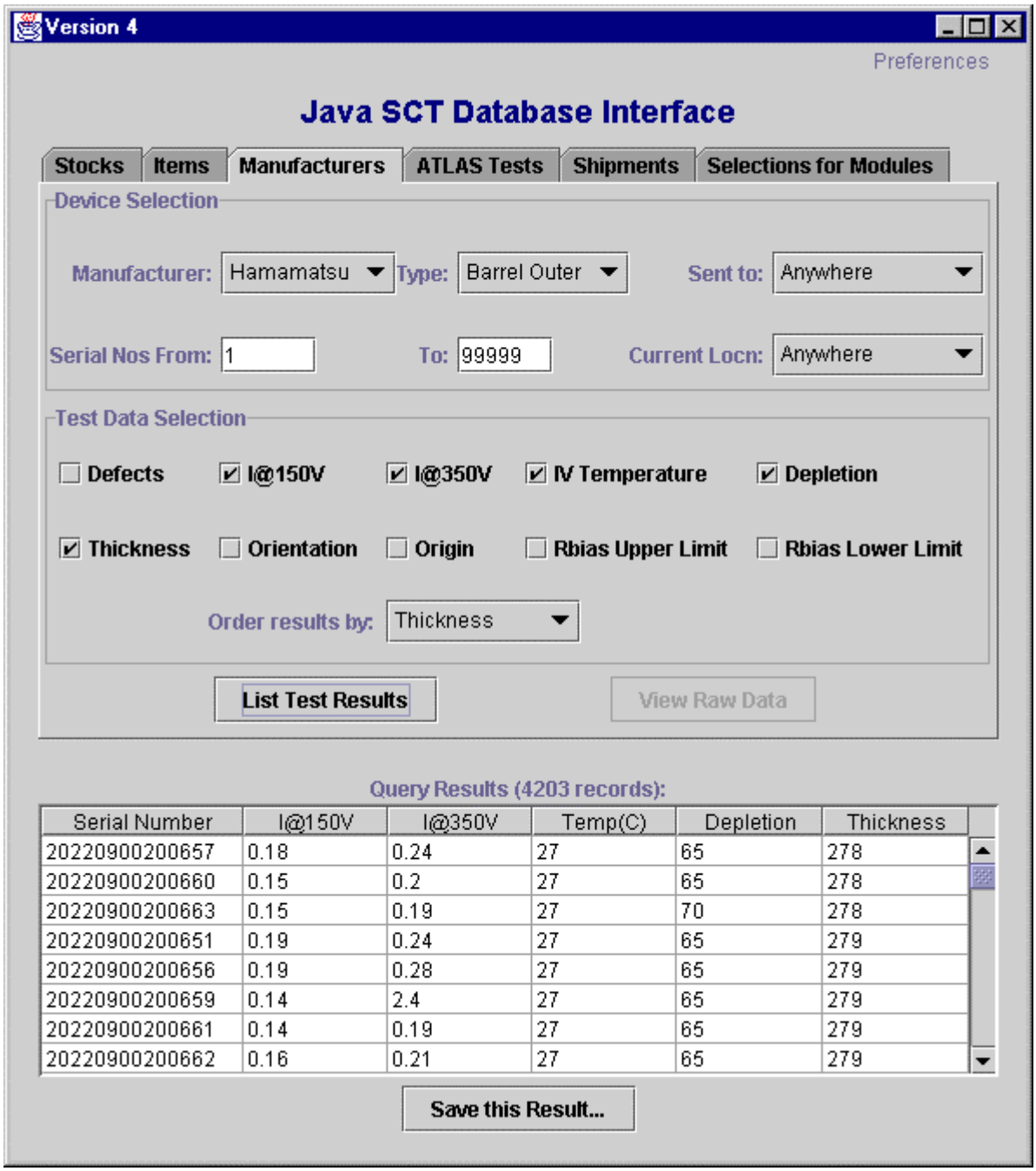
Serial Number	Shipment No	Sent from	Received By	Send Date	Received?
20220900200177	900000005	Hamamatsu	Cambridge	10MAY2000	YES
20220900200177	990000050	Cambridge	Sheffield	09JUN2000	YES
20220900200177	990000102	Sheffield	Cambridge	04AUG2000	YES
20220900200177	70000017	Cambridge	RAL	02APR2001	YES

This detector has been shipped 4 times

Hamamatsu->Cambridge->Sheffield->Cambridge->RAL

Example of Manufacturers Query:

List manufacturer data for all barrel detectors supplied by Hamamatsu, listed in order of wafer thickness (thinnest first):

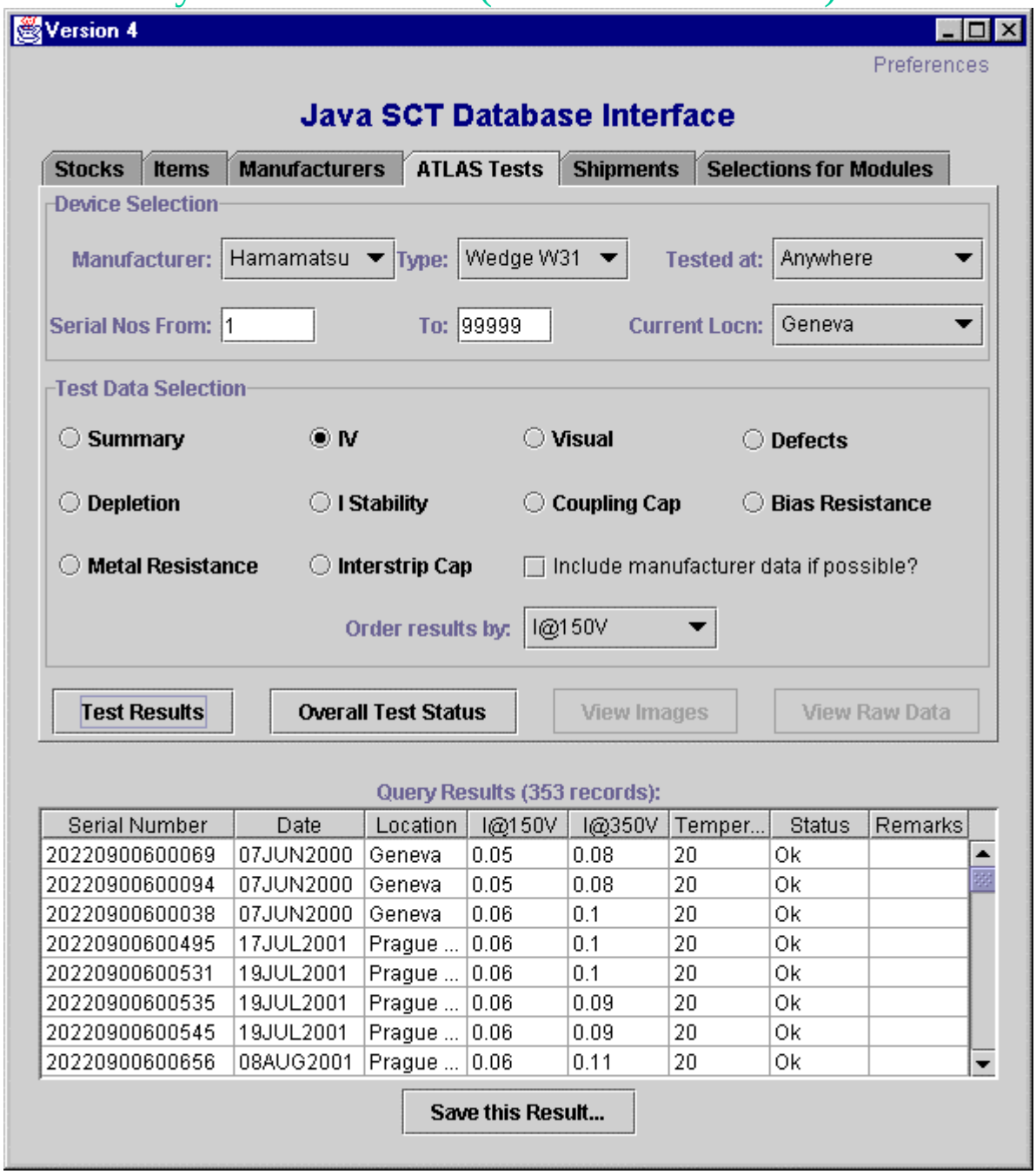


Serial Number	I@150V	I@350V	Temp(C)	Depletion	Thickness
20220900200657	0.18	0.24	27	65	278
20220900200660	0.15	0.2	27	65	278
20220900200663	0.15	0.19	27	70	278
20220900200651	0.19	0.24	27	65	279
20220900200656	0.19	0.28	27	65	279
20220900200659	0.14	2.4	27	65	279
20220900200661	0.14	0.19	27	65	279
20220900200662	0.16	0.21	27	65	279

4203 barrels have been registered by Hamamatsu, the thinnest is 278 microns.

Example of ATLAS Tests Query

Eg List IV data of all W31 Hamamatsu devices currently at Geneva, regardless of where the IV test was performed. Ordered by current at 150V (lowest currents first):

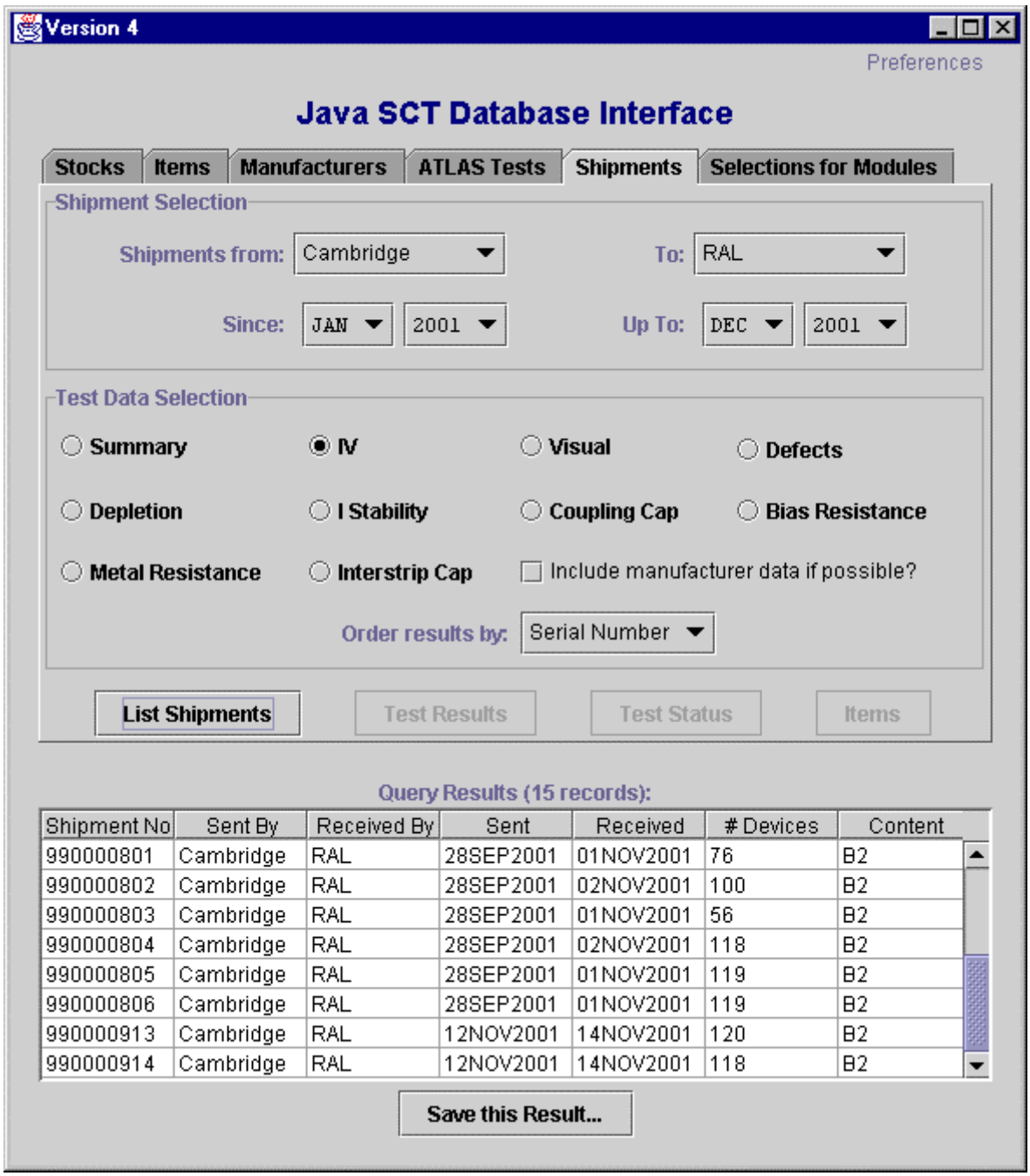


Serial Number	Date	Location	I@150V	I@350V	Temper...	Status	Remarks
20220900600069	07JUN2000	Geneva	0.05	0.08	20	Ok	
20220900600094	07JUN2000	Geneva	0.05	0.08	20	Ok	
20220900600038	07JUN2000	Geneva	0.06	0.1	20	Ok	
20220900600495	17JUL2001	Prague ...	0.06	0.1	20	Ok	
20220900600531	19JUL2001	Prague ...	0.06	0.1	20	Ok	
20220900600535	19JUL2001	Prague ...	0.06	0.09	20	Ok	
20220900600545	19JUL2001	Prague ...	0.06	0.09	20	Ok	
20220900600656	08AUG2001	Prague ...	0.06	0.11	20	Ok	

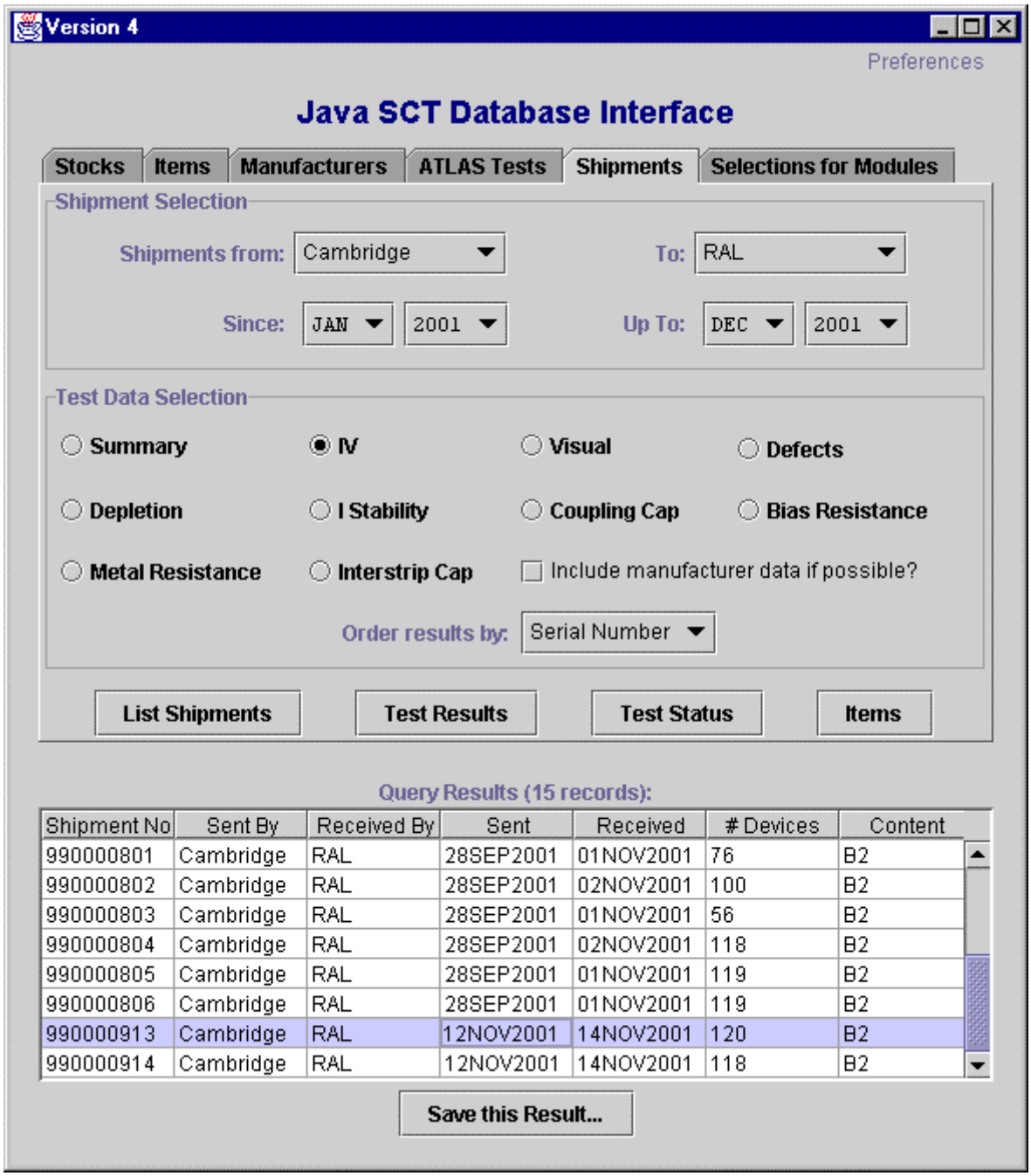
There are 353 records of IV measurements for Geneva's W31 detectors, the lowest was 50nA@150V measured on 7th June 2000 at Geneva.

Example of Shipments Query

List of shipments from Cambridge to RAL, between January 2001 to the present day:

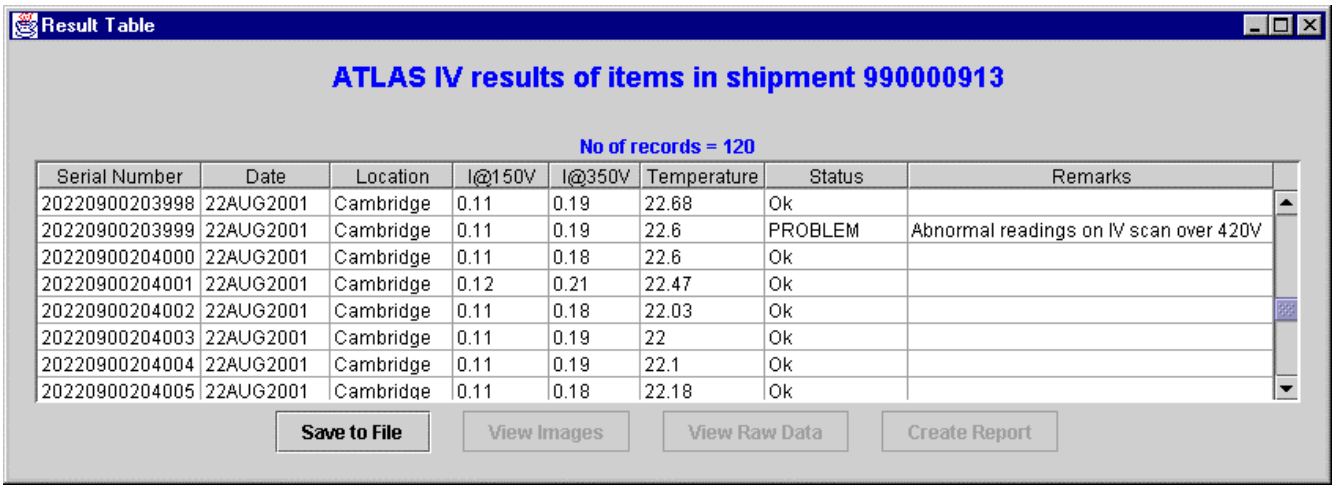


Test Results, Test Status, and Items queries become available for a shipment if you select the row:

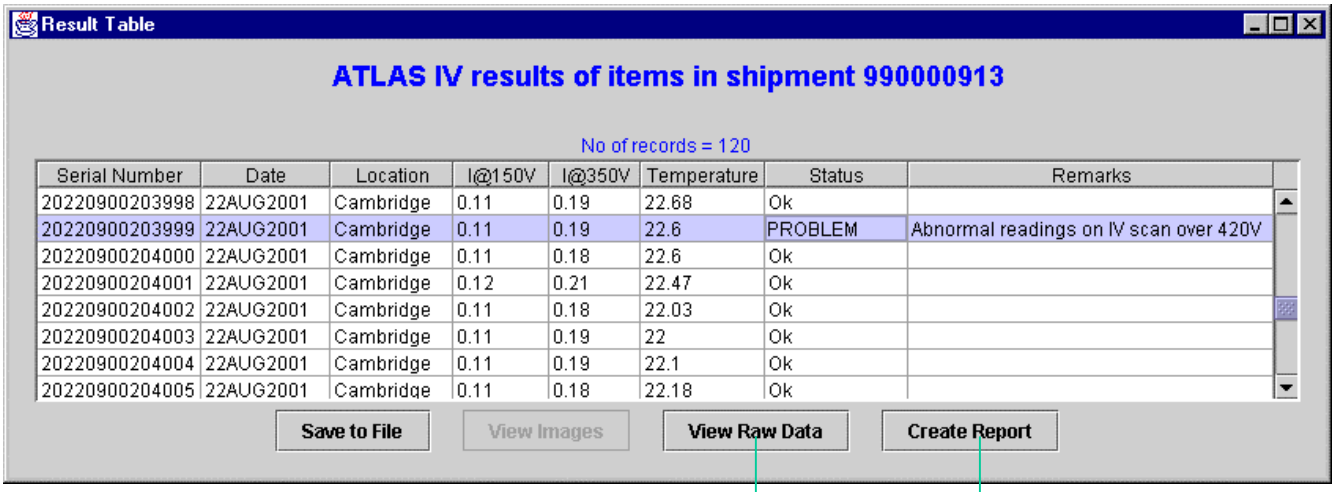


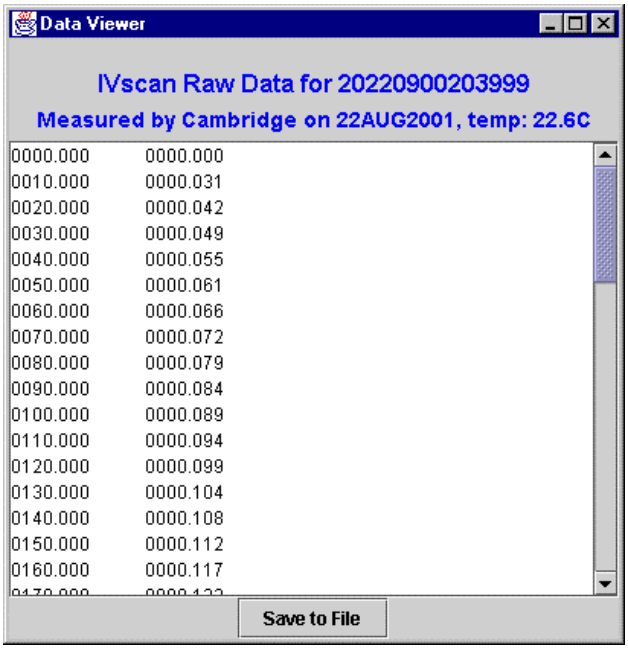
Eg to list the IV data for all items in this shipment, select "IV" in Test Data Selection panel, and click on "Test Results" button

A new window opens with a spreadsheet of all IV measurements:



Then select a row to extract even more information:

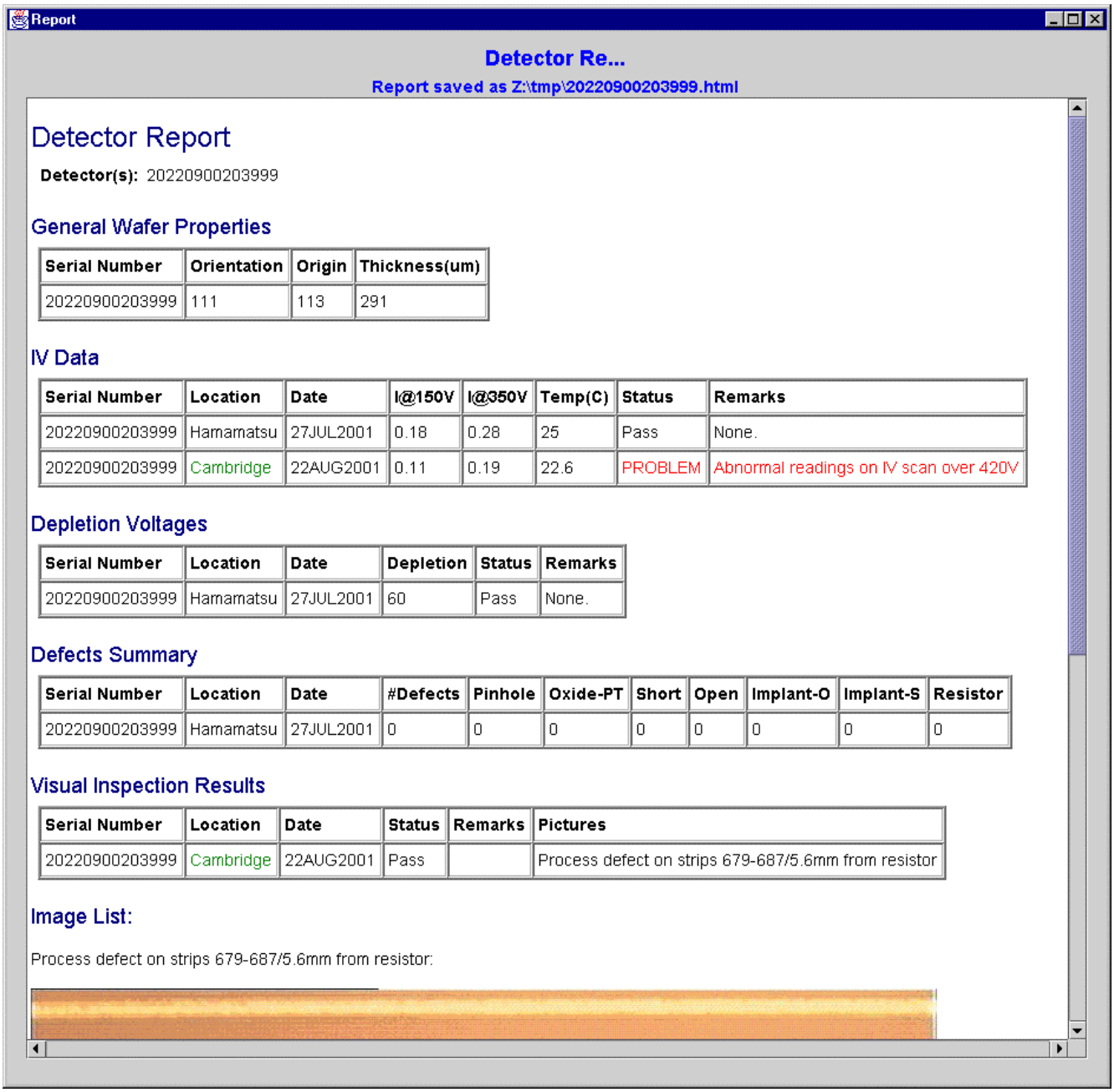




View the raw data

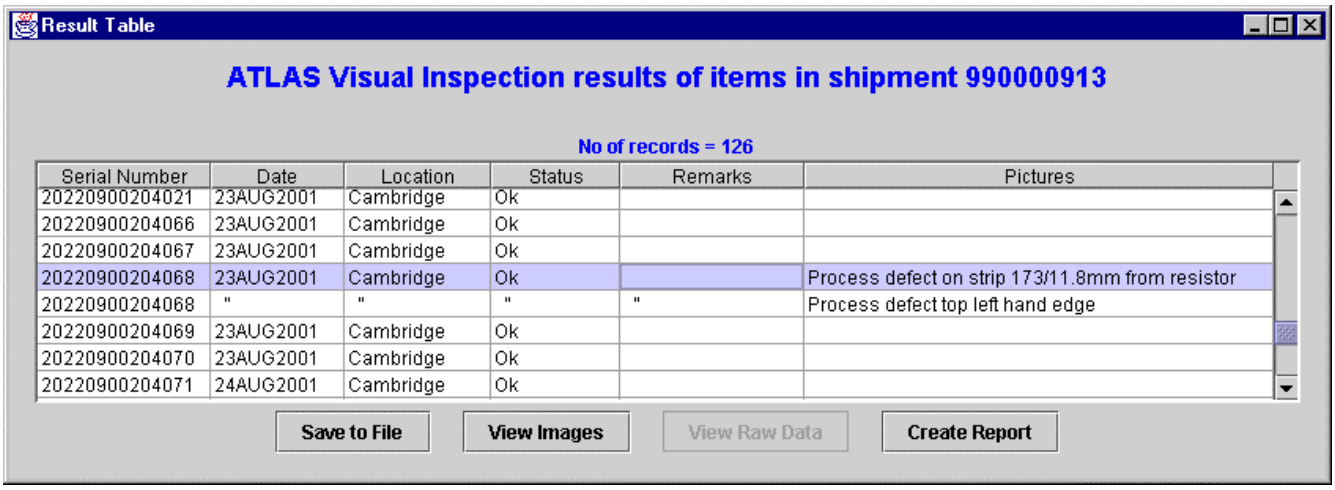
Generate full test report on this device

Full Test Report option generates an HTML file, and opens a java-equivalent web browser:



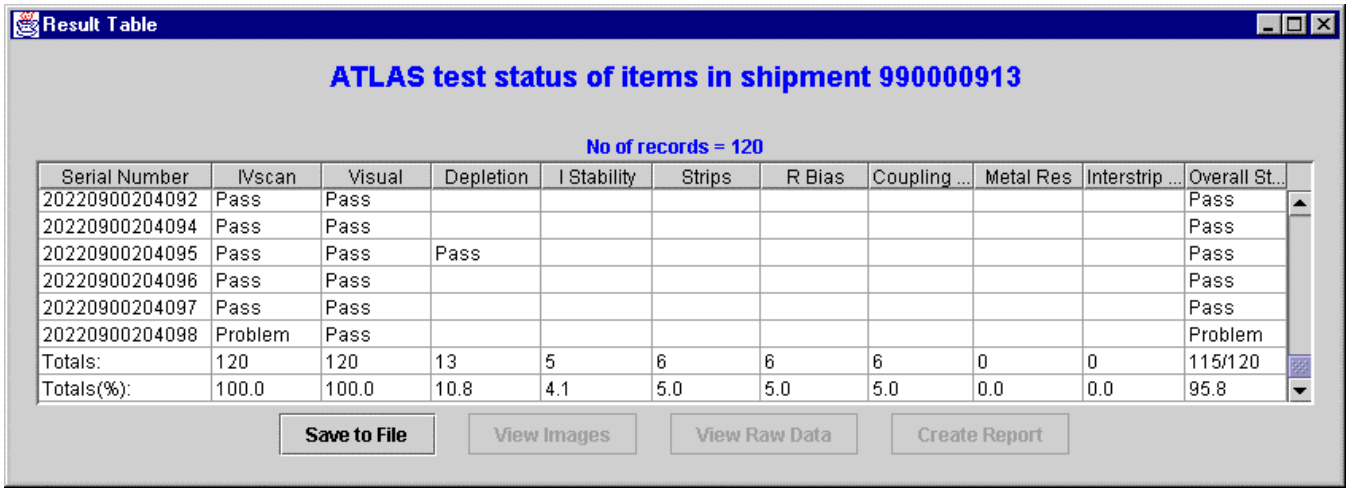
Report can be viewed by any web browser (IE, netscape...) and over the web if GUI is configured appropriately.

Visual inspection results for all items in a shipment:



To view any images, select the row and click on “View Images”, to launch an “image viewer”:

Test Status Reports



Serial Number	IVscan	Visual	Depletion	I Stability	Strips	R Bias	Coupling ...	Metal Res	Interstrip ...	Overall St...
20220900204092	Pass	Pass								Pass
20220900204094	Pass	Pass								Pass
20220900204095	Pass	Pass	Pass							Pass
20220900204096	Pass	Pass								Pass
20220900204097	Pass	Pass								Pass
20220900204098	Problem	Pass								Problem
Totals:	120	120	13	5	6	6	6	0	0	115/120
Totals(%):	100.0	100.0	10.8	4.1	5.0	5.0	5.0	0.0	0.0	95.8

Lists what tests have been performed on each detector, and the status of that test (“Pass”, “Problem” or “FAIL”), together with overall statistics.

Overall status flag:

• “Pass” if all tests were good, AND both and IVscan and a visual inspection have been performed

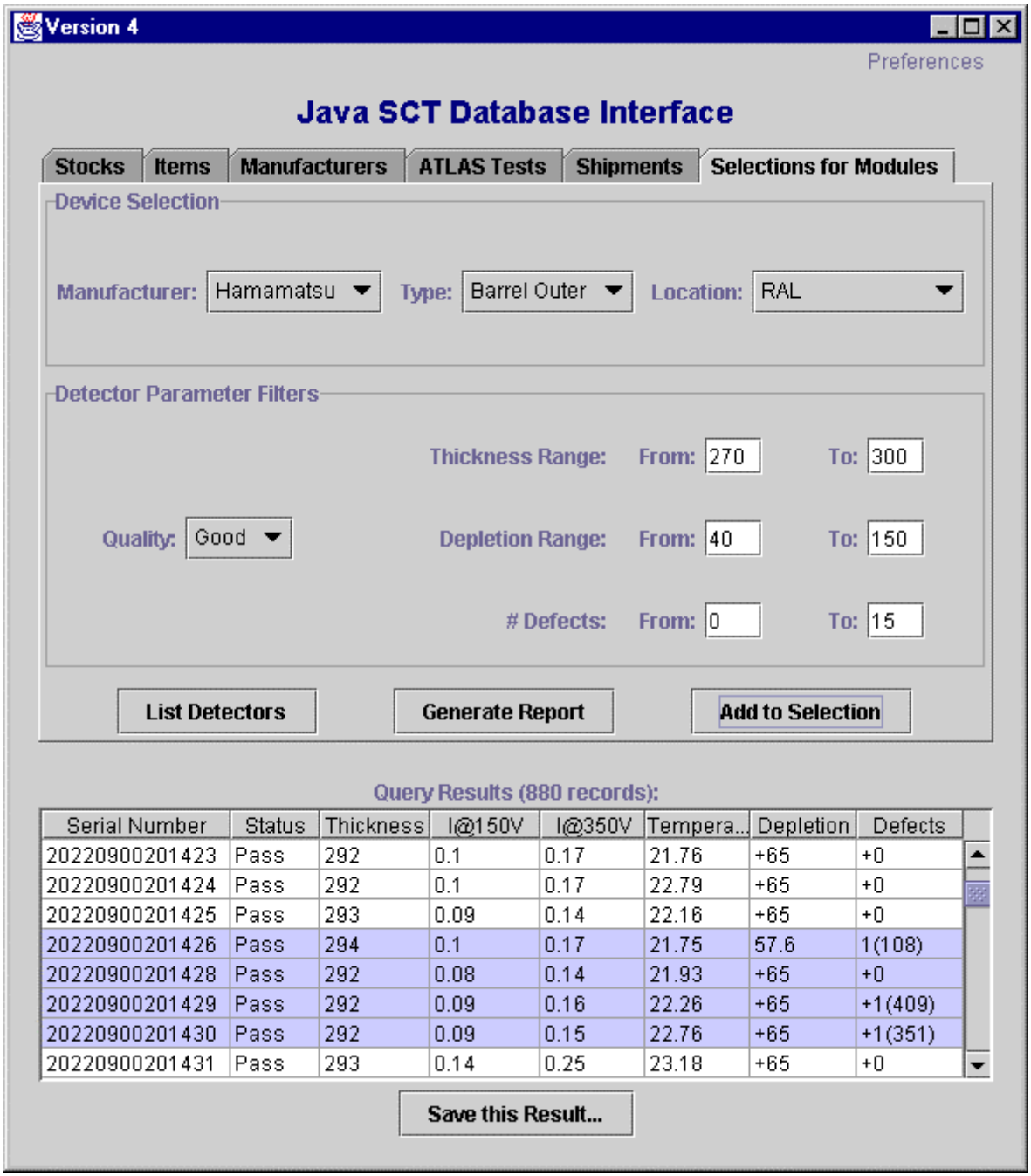
• “Problem” if one or more tests showed a problem, AND both an IVscan and visual inspection have been performed

• “FAIL” if any test failed

• “Pending” if either an IVscan or visual examination is still pending

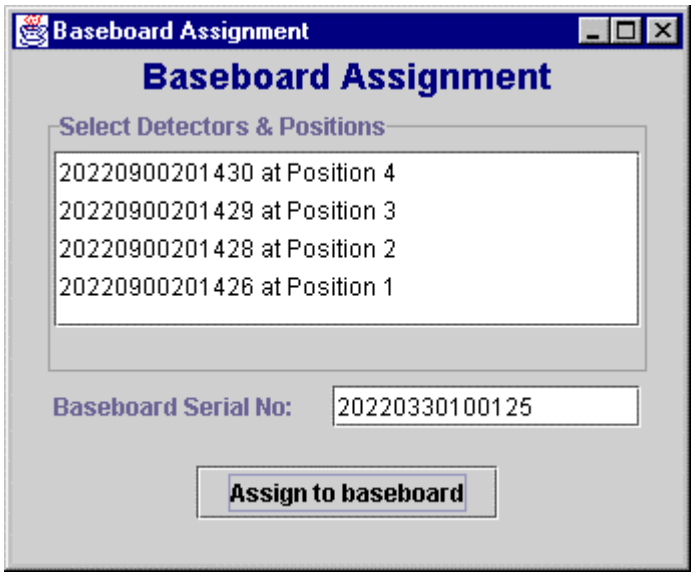
Selections for Modules

You need a list of all non-assembled devices at your institute, of a specified manufacturer, shape, quality and satisfying a specified range of parameters:

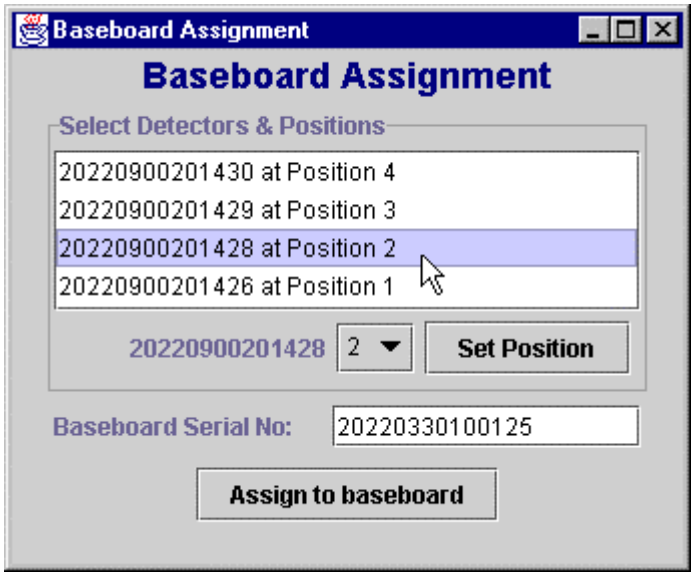


Select one or several detectors from the list, to assign to a baseboard or simply to generate more test information.

Baseboard assignment dialog

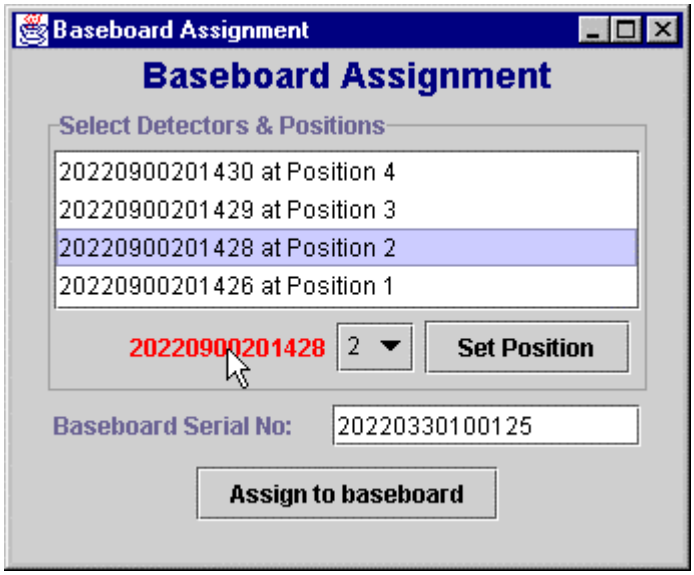


The software automatically assigns positions as you assign detectors to the baseboard.



But you can change the position on the baseboard by:

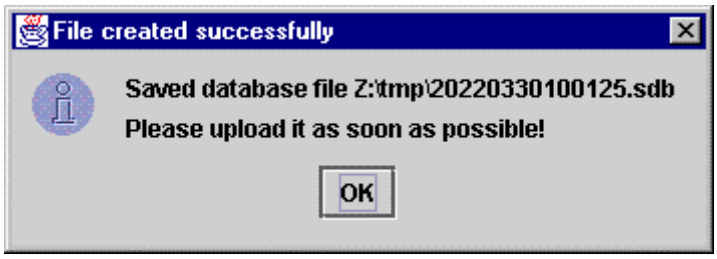
1 selecting a row
2 use menu to assign new position
3 Click on ‘Set Position’



Alternatively you can remove a detector from the list, by

1 selecting a row
2 click on the detector serial number next to the menu

If you wish to proceed with the assignment, the appropriate database file is generated:



Together with a full report as an HTML document:

Report

Baseboard Assignment Report

Report saved as Z:\tmp\20220330100125.html

Assignment Report for Baseboard 20220330100125

Baseboard: 20220330100125

Detector(s): 20220900201430 at Position 4
20220900201429 at Position 3
20220900201428 at Position 2
20220900201426 at Position 1

General Wafer Properties

Serial Number	Orientation	Origin	Thickness(um)
20220900201426	111	056	294
20220900201428	111	056	292
20220900201429	111	056	292
20220900201430	111	056	292

IV Data

Serial Number	Location	Date	I@150V	I@350V	Temp(C)	Status	Remarks
20220900201426	Hamamatsu	01MAR2001	0.09	0.13	27	Pass	None.
20220900201426	Cambridge	09APR2001	0.1	0.17	21.75	Pass	None.
20220900201428	Hamamatsu	01MAR2001	0.09	0.13	26	Pass	None.
20220900201428	Cambridge	09APR2001	0.08	0.14	21.93	Pass	None.
20220900201429	Hamamatsu	01MAR2001	0.09	0.14	26	Pass	None.
20220900201429	Cambridge	09APR2001	0.09	0.16	22.26	Pass	None.
20220900201430	Hamamatsu	01MAR2001	0.09	0.13	26	Pass	None.
20220900201430	Cambridge	09APR2001	0.09	0.15	22.76	Pass	None.

(continuation of assignment report, showing inclusion of test images as well as result tables:)

Report

Baseboard Assignment Report

Report saved as Z:\tmp\20220330100125.html

Serial Number	Location	Date	Depletion	Status	Remarks
20220900201426	Hamamatsu	01MAR2001	65	Pass	None.
20220900201426	Cambridge	09APR2001	57.6	Pass	None.
20220900201428	Hamamatsu	01MAR2001	65	Pass	None.
20220900201429	Hamamatsu	01MAR2001	65	Pass	None.
20220900201430	Hamamatsu	01MAR2001	65	Pass	None.

Defects Summary

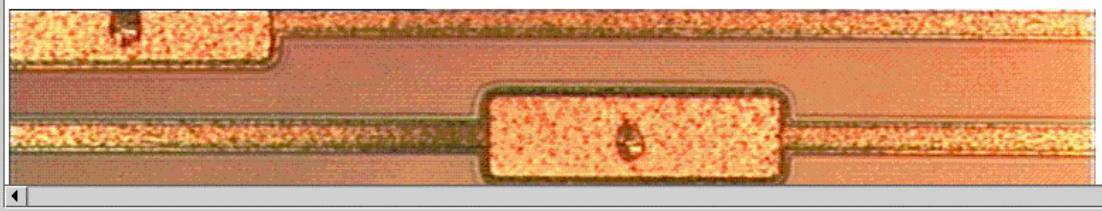
Serial Number	Location	Date	#Defects	Pinhole	Oxide-PT	Short	Open	Implant-O	Implant-S	Resistor
20220900201426	Hamamatsu	01MAR2001	1	1 (108)	0	0	0	0	0	0
20220900201426	Cambridge	17APR2001	1	1 (108)	0	0	0	0	0	0
20220900201428	Hamamatsu	01MAR2001	0	0	0	0	0	0	0	0
20220900201429	Hamamatsu	01MAR2001	1	1 (409)	0	0	0	0	0	0
20220900201430	Hamamatsu	01MAR2001	1	1 (351)	0	0	0	0	0	0

Visual Inspection Results

Serial Number	Location	Date	Status	Remarks	Pictures
20220900201426	Cambridge	09APR2001	Pass		
20220900201428	Cambridge	09APR2001	Pass		
20220900201429	Cambridge	09APR2001	Pass		
20220900201430	Cambridge	09APR2001	Pass		Blemish/discolourisation across strips 750-760

Image List:

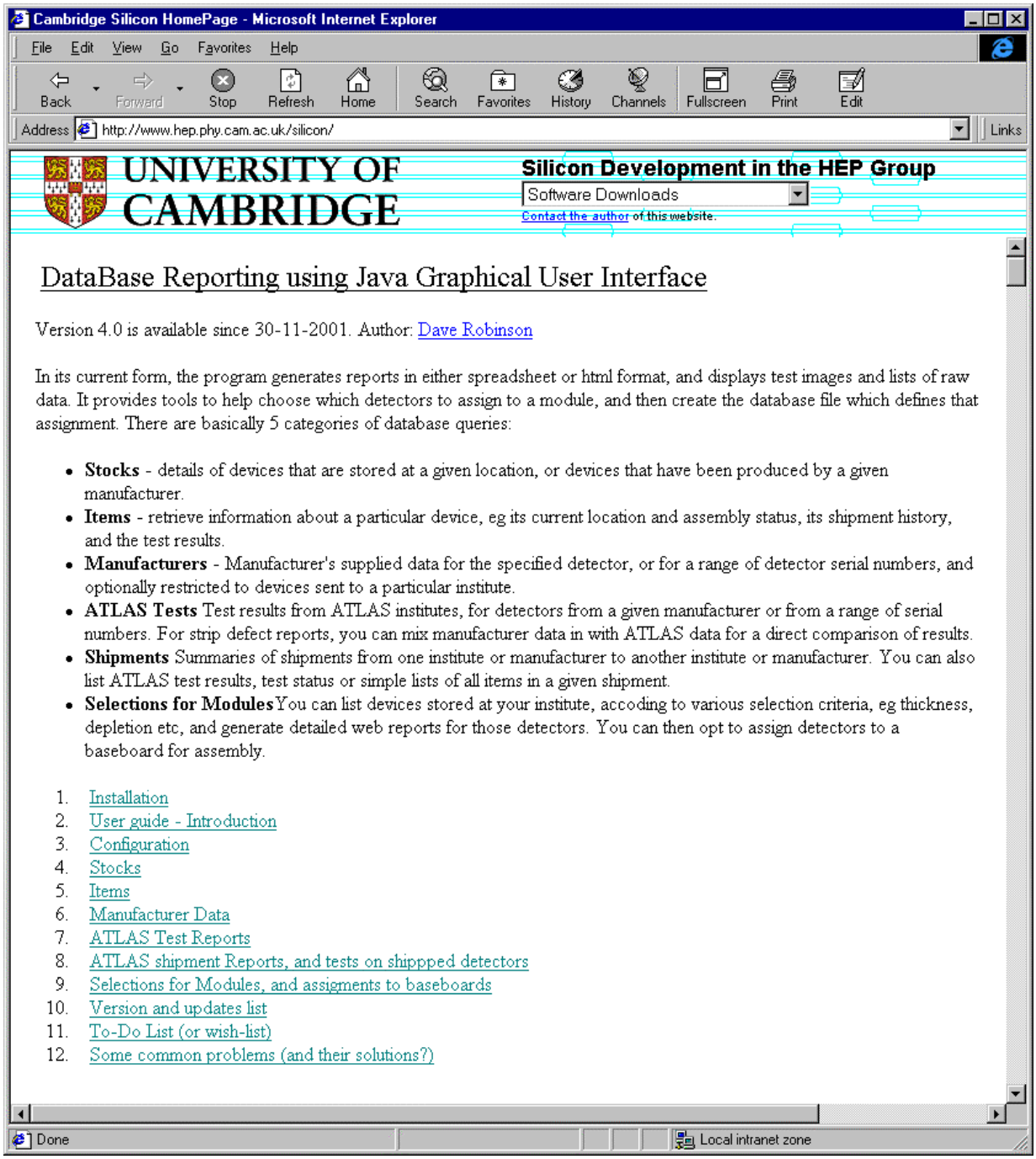
Blemish/discolourisation across strips 750-760:



The GUI is available NOW

- You need Java 1.2 or later (either JDK or JRE)
- Single file from Geneva database web page - contains JDBC classes
- Single file from Cambridge

Links, and user guide, available from www.hep.phy.cam.ac.uk/silicon (select menu item ‘Software Downloads’)



Summary

• There is now a vast amount of detector data in the SCT database from both manufacturers and ATLAS QA institutes, and further significant data entries are foreseen from the module and ASICs communities.

• It is important for the SCT community to be able to fully exploit this data, and there is therefore a strong need for the development of new tools to achieve this.

• The java GUI presented in this talk has been developed primarily for the needs of the SCT detector community and to provide a detector interface for the modules community.

• It *could* potentially be expanded or duplicated to provide other reports more specific to modules, ASICs and assembly.

But reports need to be optimised to really meet people's needs, and this requires representative members of the different SCT communities to be actively involved