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# Users' Interface Overview

The users' interface when application is started is show in figure 1 below.
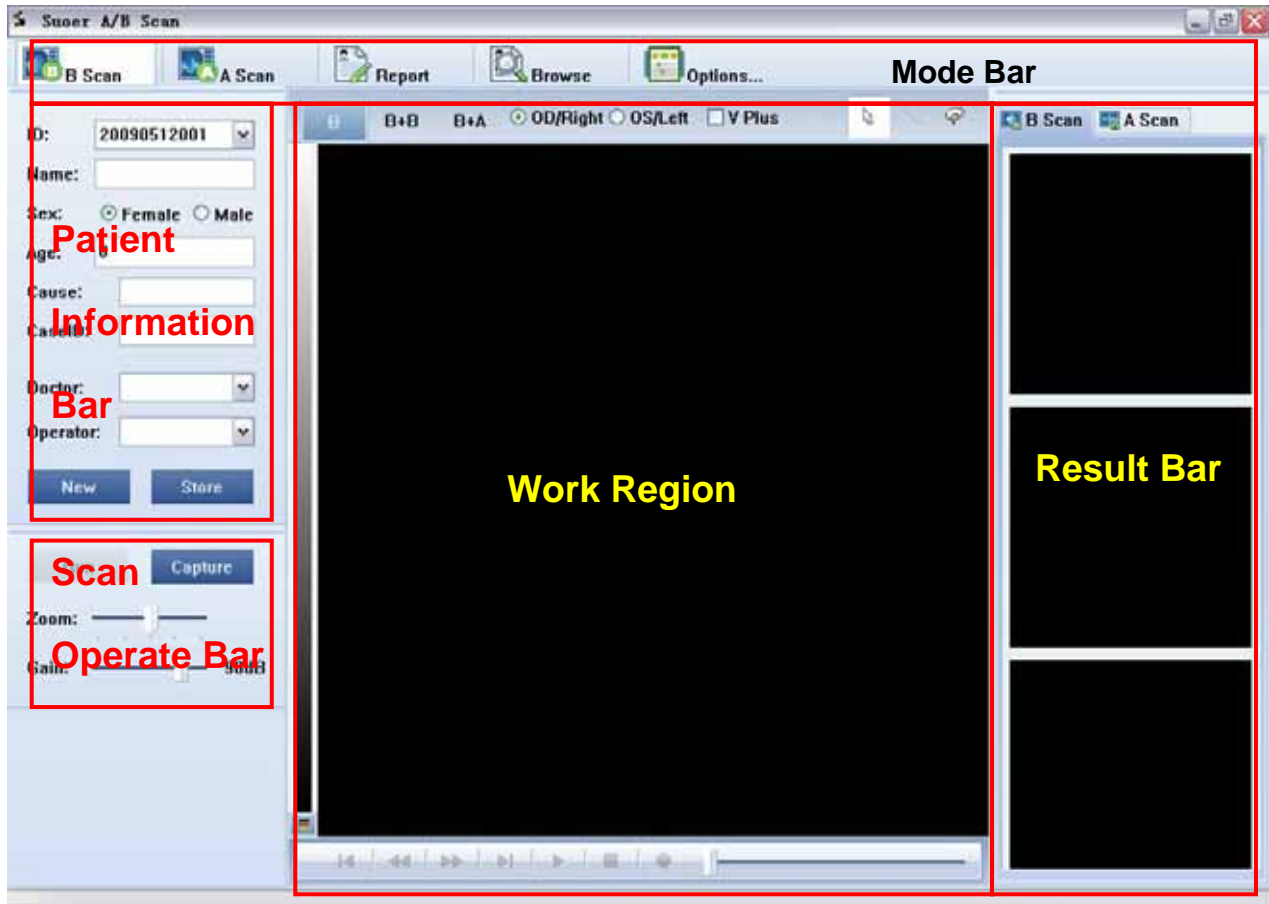


**Fig 1 Users' Interface**

**Mode Bar**   In the up side of the interface is Mode Bar. The application provides 5 modes for using, and they are B-Scan Mode, A-Scan Mode, Report Edit Mode, Recode Browse Mode and Option Mode.

**Patient Information Bar**    In the left side of the interface is Patient Information Bar that shows information of patient. Users can create new cases or store a certain case. Patient Information Bar can be shown in B-Scan Mode, A-Scan Mode and Report Edit Mode. It's hidden automatically in Browse Mode.

**Scan Operate Bar**     Scan Operate Bar is shown in the down left side of the interface, below the Patient Information Bar. It is used to control the sampling of data. Users can run/freeze the image/wave, capture image/wave, adjust gain, etc. Scan Operate Bar is

shown in B-Scan Mode and A-Scan Mode, and it is hidden automatically in other modes. The Scan Operate Bar shows a few different in B-Scan Mode and A-Scan Mode because of different operations.

**Result Bar**    In the right side of the interface there is Result Bar. It is used to demonstrate B-Scan and A-Scan results, and results are shown in two sheets. Users can switch sheets to view different data.

**Work Region**    The work region is shown in the center of the interface. B-Scan Image is shown in the Work Region when in B-Scan Mode, combined with demonstrate mode, recall controller, TGC (Time Gain Control) curve, etc. A-Scan Wave is shown in the Work Region when in A-Scan Mode combined with check method, eye types, etc.

**Patient Information Bar Details**

Patient Information Bar is shown in figure 2. ID is shown in the first line. The ID showing in the drop list control is ID of patient who is now being scanning. Users can input patient's information, such as name, sex, age, etc.

When user finishes scanning and report is edited ready, he/she can click "**Store**" button to store all data of a case into database for long period storage. When a case is stored, its ID is deleted from the drop list control of ID.

Users can click "**New**" button to create a new case. The application will create a new ID for this case automatically.

Users can browse stored cases in Browse Mode and load them (more details in later part). The ID of loaded case is also shown in the ID drop list. "**Store**" button will change as "**Close**" when a selected case is loaded from database. Users can click the button to close the loaded case, and its ID will be deleted from the drop list control.

**Fig 2 Patient Information Bar**          **Notice: Loaded cases cannot be modified.**

**Operate Bar Details**

In B-Scan Mode or A-Scan Mode, corresponding Operate Bar will be shown below Patient Information Bar.
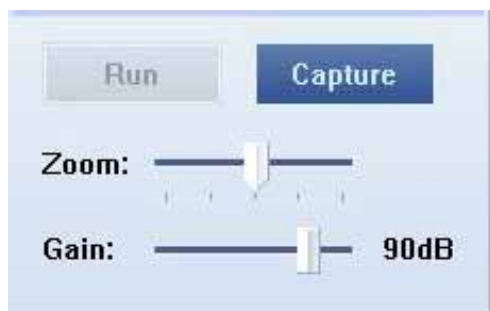


**Fig 3 B-Scan Operate Bar**

In B-Scan Operate Bar, if the device is not connected properly, the "**Run**" button will be grayed and disabled, as shown in figure 3. **Run**/**Freeze** button can control the device to run or freeze. When probe is frozen, the button shown as "**Run**", when probe is running, the button shown as "**Freeze**". The left pedal and F4 key on keyboard have the same functions.

In B-Scan Mode, users can click "**Capture**" button to capture images. Captured image will be shown in the Result Bar on the right side of interface. When user selects a certain image in Image List, and do some measurements or other operations, the Capture button will shown as "**Save**", User can click the button to save the measurements. The function is the same as the right pedal and F6 key on keyboard.

Zoom slider can adjust the scan region of B-Scan Image. It has 5 levels for 10MHz probe and 3 levels for 20MHz probe. Probe type can be recognized by the application automatically.

Gain Slider is used to adjust the gain of signal with the range from 30dB to 105dB.

A-Scan Operate Bar is almost same as B-Scan Operate Bar. Compare figure 4 with figure 3. Application provides 3 work modes for A-Scan measurement.



**Fig 4 A-Scan Operate Bar**

**Auto Mode:** freeze A-Scan wave and save data into Data list automatically.

**Semi-Auto Mode:** freeze A-Scan wave automatically, and save the data into Data list manually.

**Manual Mode:** freeze A-Scan wave by pedal or click "Freeze" button and save it into Data List manually.
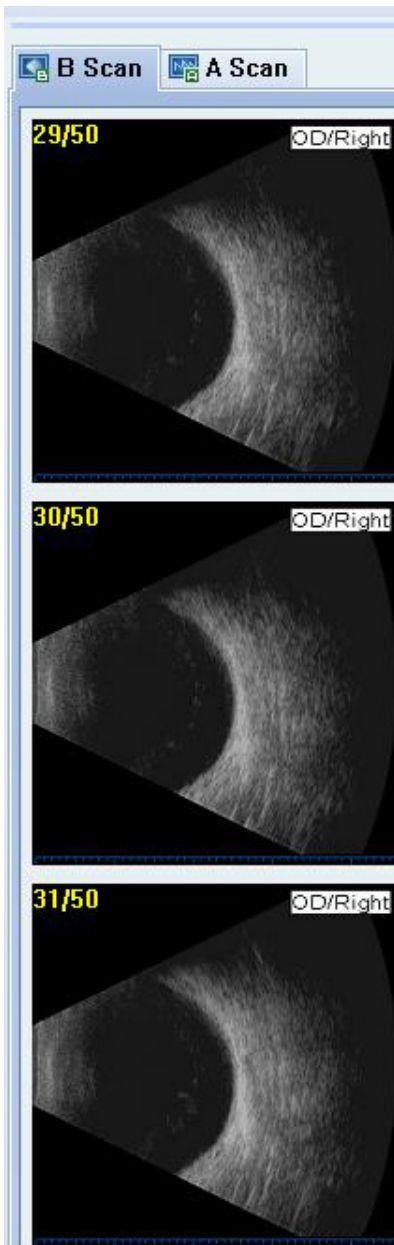
**Result Bar Details**



**Fig 5 B-Scan Result**

Captured B-Scan images and A-Scan waves are shown in the Result Bar.

B-Scan sheet of Result Bar is showing in Fig 5, B Scan images are showing in a list with maximum count of 50. Users can select an image or roll list with mouse.

Users can right click at an image, and select different operations, as shown in Fig 6, these operations include:

- Export selected image
- Export image list
- Modify the property of an image (Left/Right Eye, Scan Direction)
- Import images list as film.
- Display the selected image by default image browser.
- Display the selected image by default image browser.
- Delete selected image



**Fig 6 Operations**

A-Scan Sheet of the Result Bar is shown in Fig 7. Users can select current eye (Left or Right) to measure. A-Scan Wave is showing in the region with black background. 10 groups of results are listing in the table below, including the items of Axial Length (AL), Anterior Chamber Depth (AC), Len thickness (L), Vitreous Depth (V). Users can select an A-Scan Wave and delete it (By click "**Delete**" button) or delete them all (By click "**Delete All**" button). The table in the bottom is Statistic Result List, including 4 groups of statistic results. They are Average of valid result (Avg), Standard Deviation (S.D.) Maximum (Max) and Minimum (Min). Please make sure the eye is set correctly before taking measuring.

Users can select B-Scan Mode or A-Scan Mode to view corresponding Result Bar. When users stored a case, the data included in the Result Bar can also be stored.
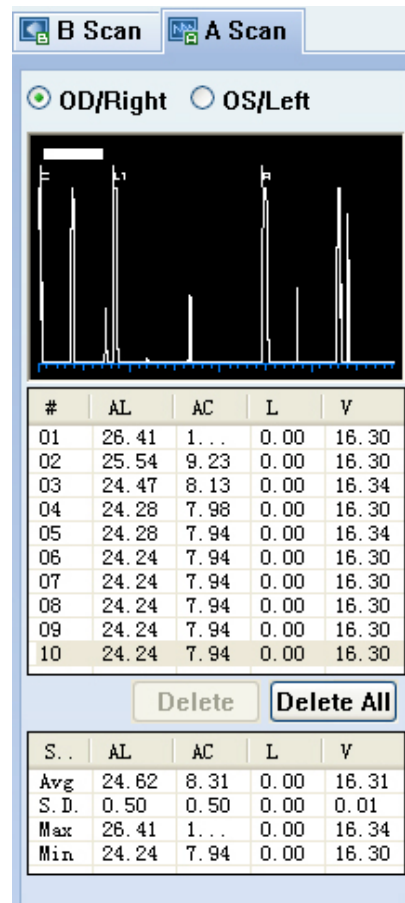


**Fig 7 A-Scan Results**

**Work Region**

Work region is the main region. It shows different contents in different modes. When in B-Scan Mode, It demonstrates B Scan Image, and provides playback operation, and measure functions, etc. In A-Scan Mode, work region demonstrates A-Scan Wave, and provides some functions such as peak recognizing and adjusting.

# B-Scan Mode

In B-Scan Mode, work region contains several modules such as pseudo color control, playback control, etc.
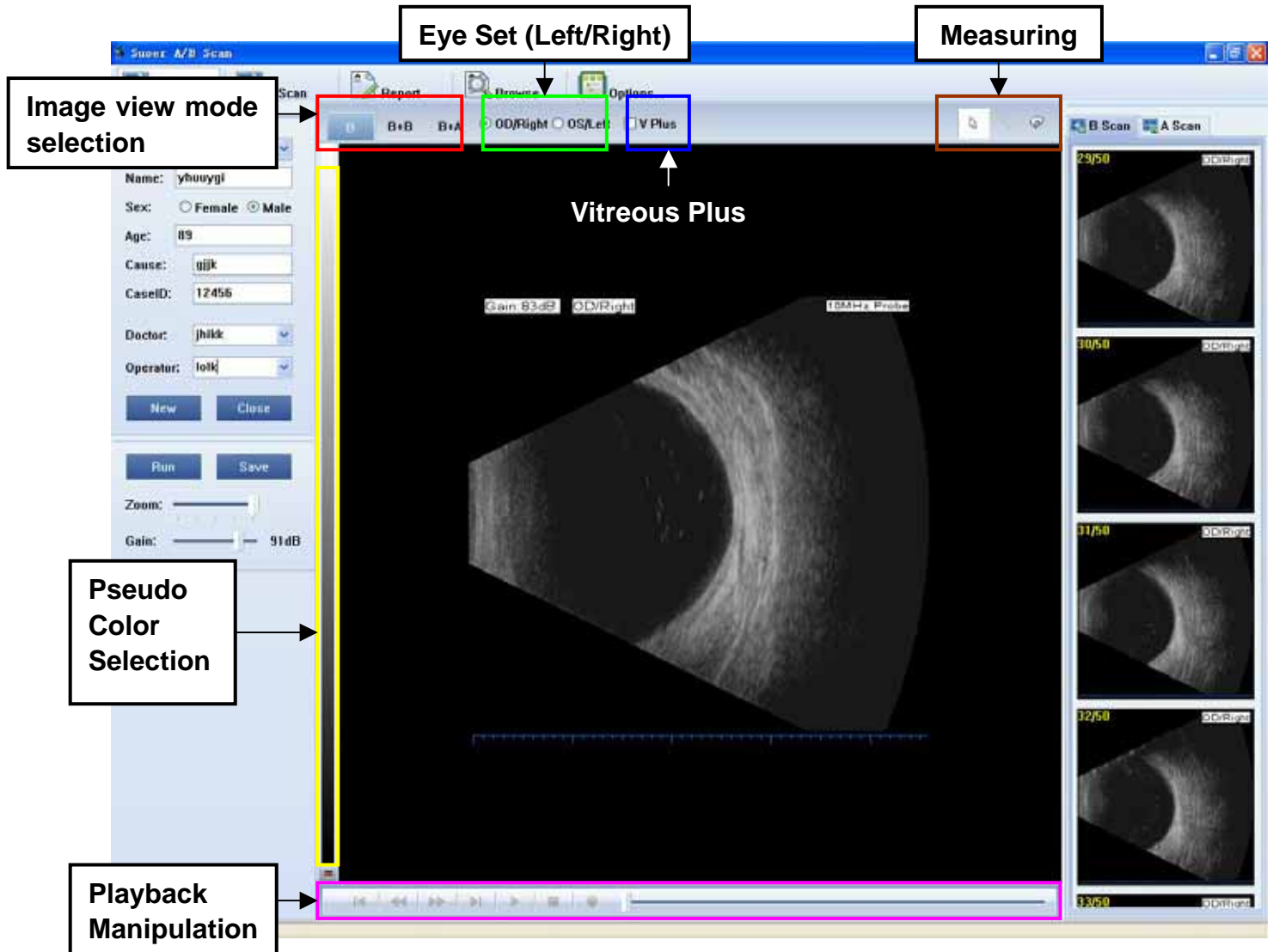


**Fig 8 B-Scan Mode**

**Image view mode selection**

Users can select B, B+B or B+A view mode for convenience. B view mode is shown in figure 8. In this mode, single image is shown in the work region, with its scales, gain, eye (Left/Right) and other tags. Scales is 1mm per grid.

Click "**B+B**" button and select B+B view mode. Two B Scan Images are showing together in the work region as shown in figure 9. The top and bottom images have same scale. If the Zoom of selected image is adjusted (In B-Scan Operate Bar) during scanning, the scale will change to march a new zoom level, and the other image with primary scale will
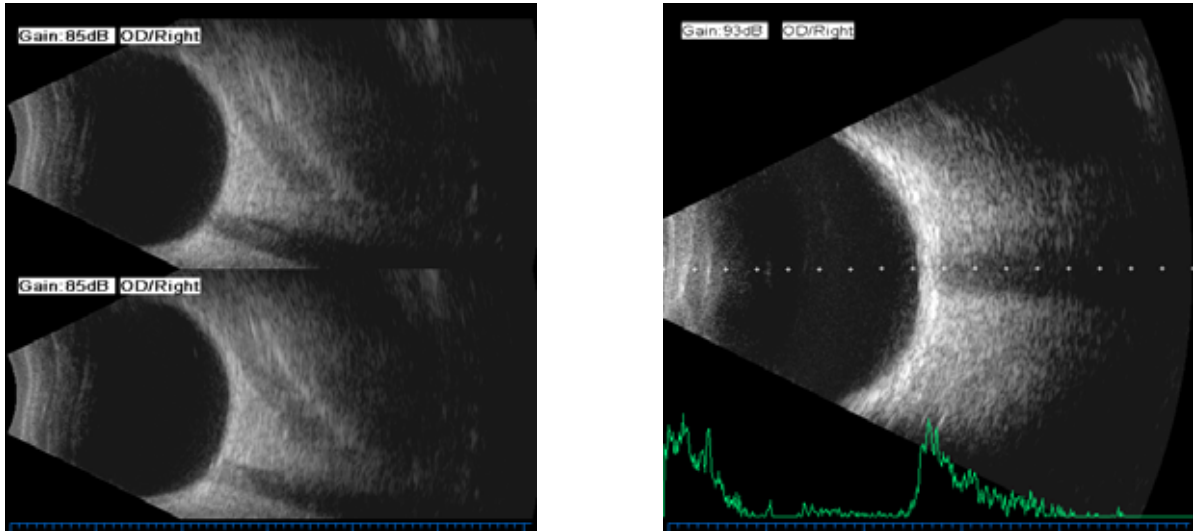
be deleted.



**Fig 9 Images of B+B mode (left) and B+A mode (right)**

Click "**B+A**" button and select B+A view mode. One B-Scan Image is showing together with the A scan line and its waveform, as shown in figure 9(Right image). Users can drag the A scan line to adjust it at desired place. The A-Scan waveform will change accordingly.

**Eye Set (Left/Right)**

Users set current checking eye here. Eye type and gain will be tagged in to image, as shown in figure 8 (Refer to white tag), and some tags are hidden. If a captured image's eye type is not set correctly, users can correct it by modifying image property (Refer to figure 6).

**Pseudo Color Selection**

Application provides 12 kinds of pseudo color code. Users can click the button below the Pseudo Color Selection Control to select a pseudo color code.

**TGC Adjustment**

When B-Scan probe is running, playback manipulate control will be hidden and TGC adjustment control will be shown as below. Users can adjust TGC section by section. Select the box (refer to red square in figure below) on the left call activates TGC, or it will be invalid. The curve of TGC can be adjust by move the points of the curve. Move up the point means increase the gain, move down the point means decrease the gain.

**Playback Manipulation**

Application can cache up to 100 frames of B-Scan images (about 10 seconds) before probe is frozen. These images can be browsed by manipulate the buttons or slider of the Playback Manipulate Control. The means of buttons follow: First frame, Previous frame, Next frame, Last frame, Play/Pause, Stop and Record. Slider is available for fast switch to a certain frame.
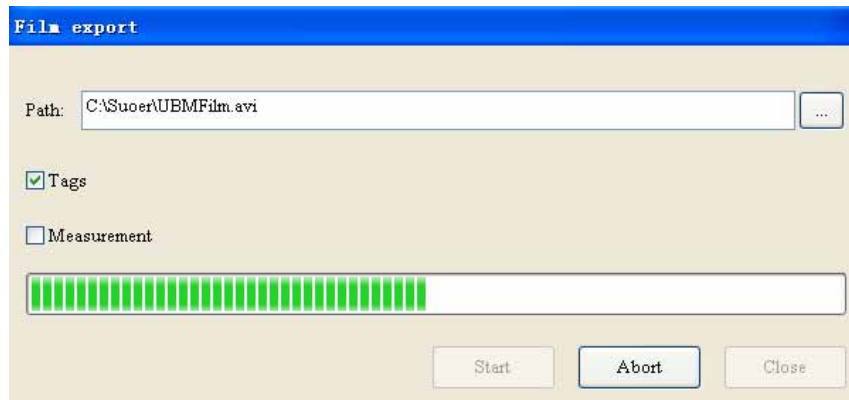


**Fig 10 Export Playback**

Recall export dialog will popup automatically when Record button is clicked. Cached images can be exported to an AVI video file. This file can be played with common video player for demonstration. Gain and eye tags, measuring results can be selected whether to be exported as part of the film frame.
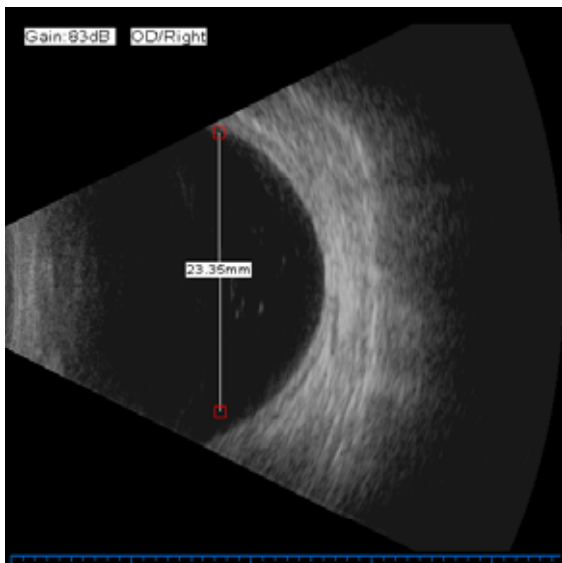
**Measuring**


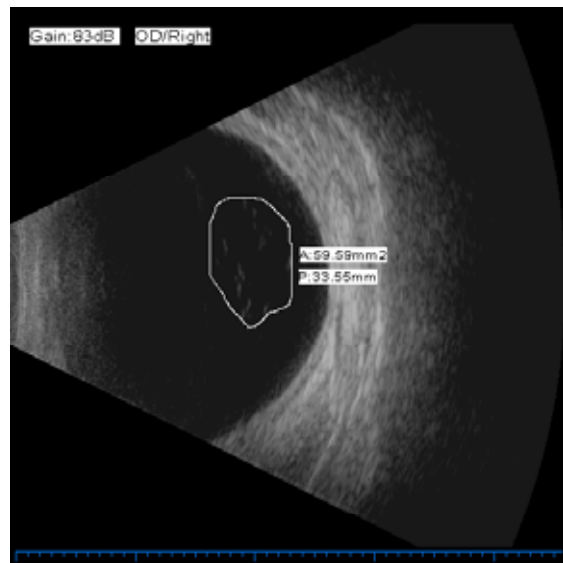
**Fig 11 Length Measuring**



**Fig 12 Area/Perimeter measurement**

Application provides two measuring methods: Length measuring and Area/Perimeter measuring.

Click button [ ] to start Length measuring. Move cursor to start point on the image, left click the mouse, move to the end point, then left click the mouse again. The length will be demonstrated and the unit is millimeter (mm). See Figure 11. Now one measurement is finished. Users can take another length measurement.

Click button [ ] to start Area/Perimeter measurement. Move cursor to the boundary of a close region. Press left button of the mouse, and move the mouse along the boundary, white line shows a track. When the track is closed, release the left button of the mouse. Start point and end point will connected automatically and form a closed region. The area (Unit: $mm^2$) and the perimeter (Unit: mm) will be demonstrated in two lines, See figure 12. Now one measurement is finished. Users can take another Area/Perimeter measurement.
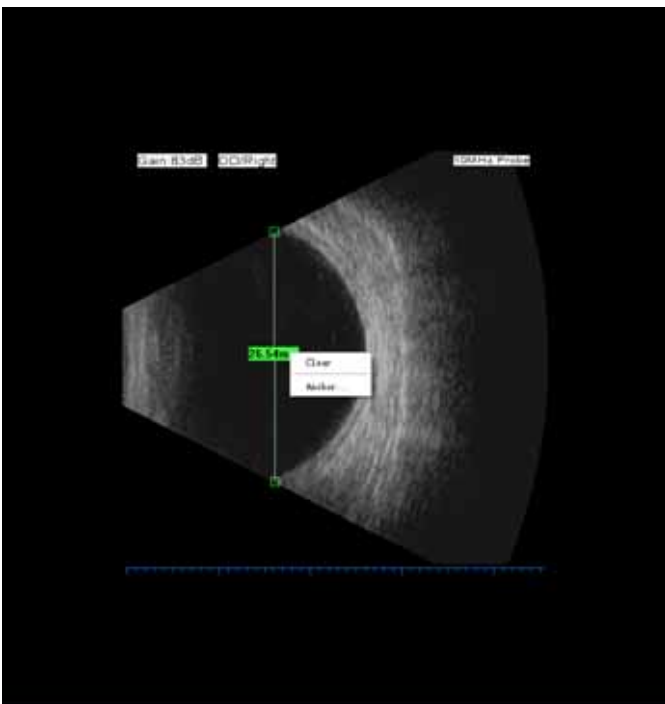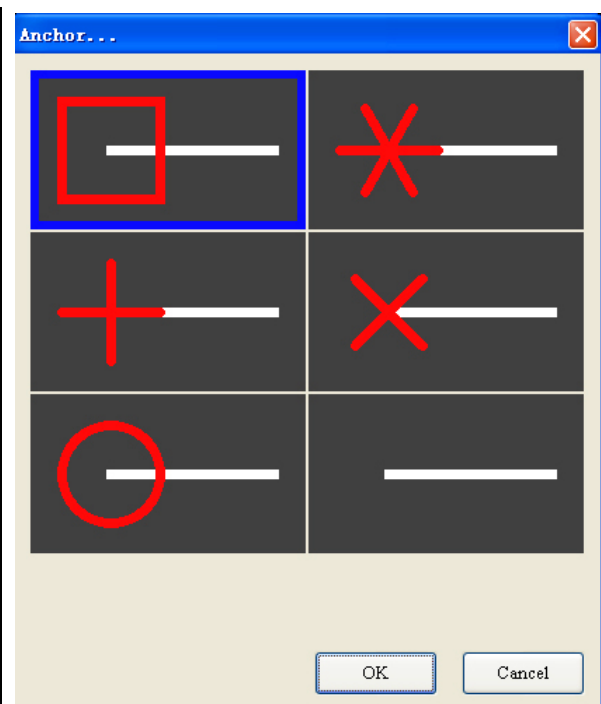


**Fig 13 Area/Perimeter Calculation**                    **Fig 14 Anchor**

Click button [ ] to modify measurements. Right click the mouse on the image region has the same function as the clicking of [ ] button. Move mouse to a measurement which need to be modified. The cursor will become hand shape. The measurement is drawn in green. Left click the mouse can drag the selected measurement. Right click the mouse,

menus will popup as shown in figure 13. Users can select to delete the measurement. For length measurement, the shape of anchor can be modified. Application provides 6 anchor styles as shown in figure 14.

When modifying Length measurement, dragging the line can move all items of measurement. Drag the start point or the end point can change length correspondently. Drag the length tag can re-position it. When modifying Area/Perimeter measurement, drag the boundary line or the result tags will re-position them respectively.
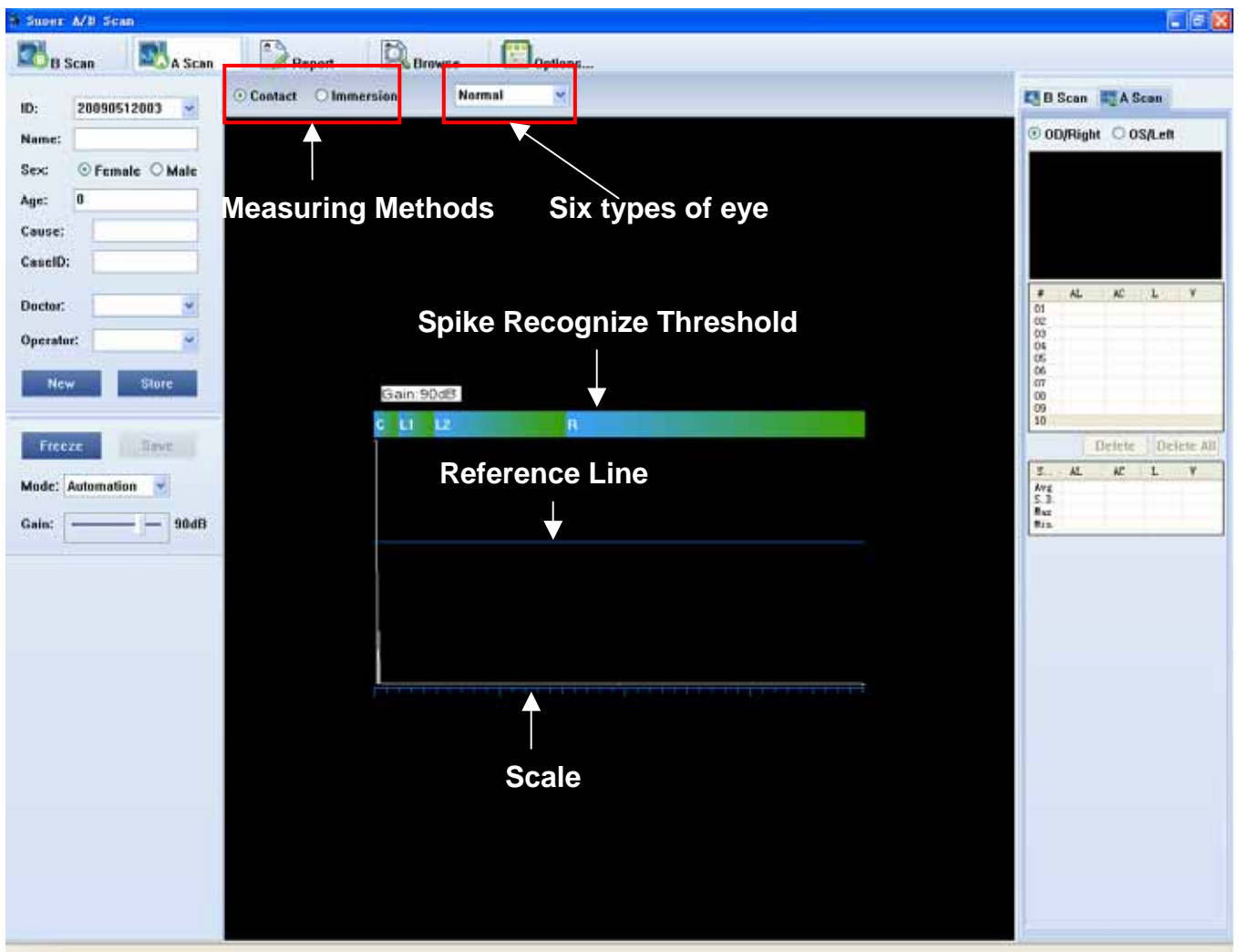
# A-Scan Mode



**Fig 15 A-Scan Mode**

In A-Scan Mode, the users' interface is shown in figure 15. Application provides two methods for A-Scan measurement: Contact and Immersion. Six types of eye can be selected according to the eye's condition. They are Normal, Dense (Cataract), Aphakic and

three Pseudo eyes (PMMA, Acrylic and Silicone).

The blue-to-green chromatobar in figure 15 are Spike Recognize Threshold. C means Corneal Spike, L1 means the first Spike of Len, L2 means the second Spike of Len. R means Retina Spike. Software will search for a certain spike in the region defined by the threshold automatically.

Reference Line is a user selects gate for valid spikes. Only the spikes higher than the line can be treated as a valid spike and can be recognized automatically by the software. Spike Recognize Threshold and Reference Line can be adjusted. Move mouse to the Reference Line, the cursor will change to be ‡ ; now the line can be dragged to a certain height. Move mouse to the boundary of a certain Spike Recognize Threshold, the cursor will change to be ⊹ ; now drag the mouse can adjust the Spike Recognize Threshold. When the waveform being frozen, application will show the spike recognize result. Users can adjust the recognize result by the same methods. Application use the recognize result and the velocities to calculate the length of each segment of eye.

**Notice: Improperly set of Spike Recognize Thresholds can lead to spike recognize mistakes. Default thresholds are available for common eyes. If it's not able to recognize spikes automatically, please adjust the thresholds according to the spikes of the waveform.**

When contact method is selected, Corneal Spike Recognize Threshold and the Recognized spike cannot be modified. When measuring different type of eyes, the Spike Recognize Threshold and the recognize result will be a little different. When aphakic eye is measuring, L2 is not available, and when pseudo eye is measuring, L1 and L2 are recognized together, and the thickness of the Len used in the calculation is the setting thickness of the IOLs.
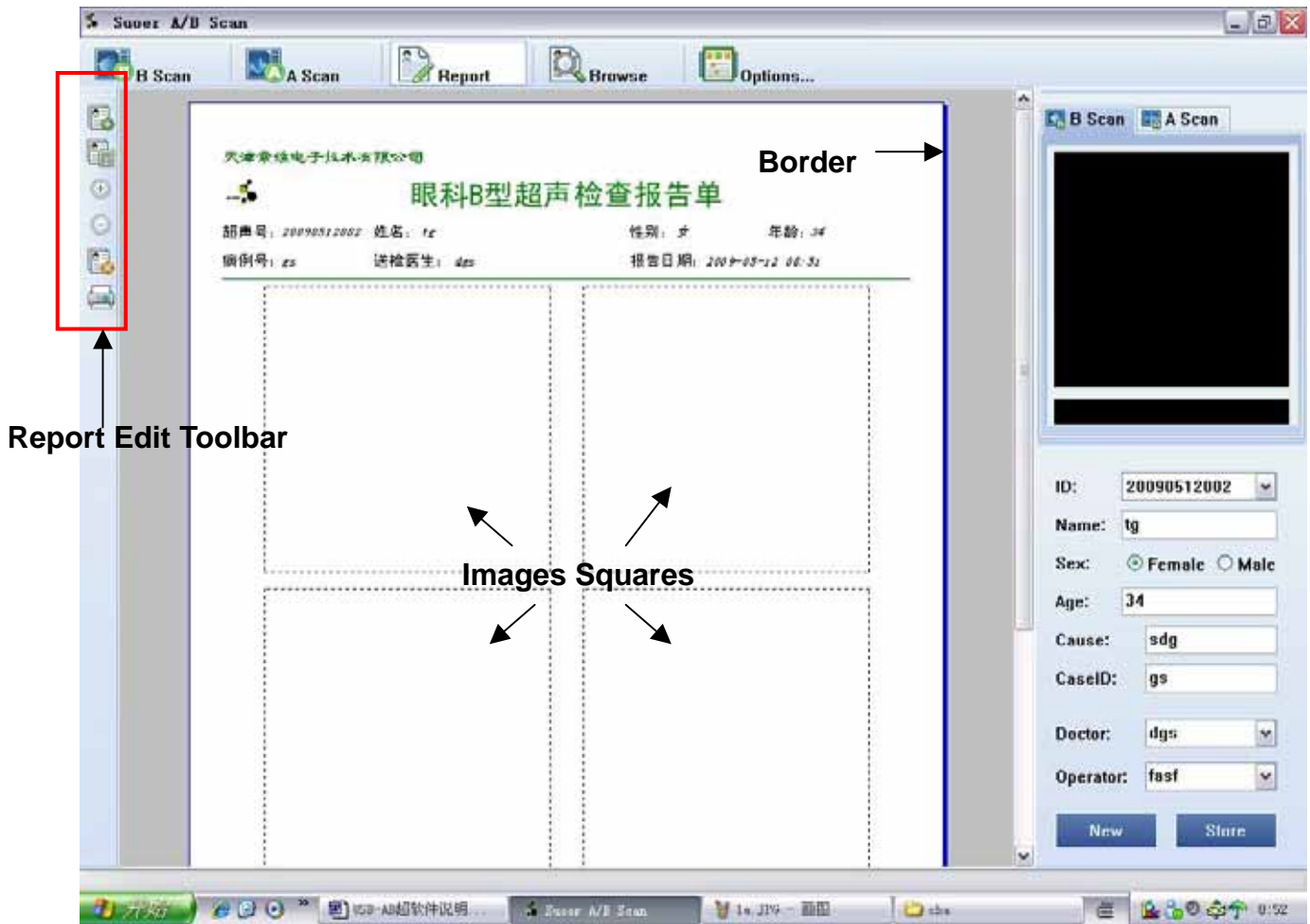
# Report Edit Mode



**Fig 16 Report Edit Mode**

In Report Edit Mode, the users' interface is shown in figure 16. It's Report Edit Toolbar on the left. The Result Bar and the Patient Information Bar is showing on the right. The report pages are showing in the Work Region.

**Report Edit Toolbar**

The Report Edit Toolbar has six buttons.

Button means create a new page of B scan report or A scan report. The new page will add at the tail of the report.

Button means selecting a layout for a current page. It is invalid when no more than one layout is ready installed in the system. Only one layout for B-Scan report and A-Scan report is installed by default.

Button ⊕ and ⊖ means expand or shrink the size of the pages.

Button 🖼 means delete the Current Page from the report. Current Page is the page with blue borders.

Button 🖨 is used to print the report.

**Edit B-Scan Report**

Default B-Scan Report Page layout is showing in figure 17. The information such as name, sex is same as the information showing in the Patient Information Bar. Every change of information in Patient Information Bar will be shown in the report immediately. So when you need to modify these contents, modify the information in the Patient Information Bar. The report date showing in the pages is the time when a page is created.

The institution name and logo can be set in the Options Dialog.

Default B-Scan Report Page Layout includes 4 image boxes. When adding images to the boxes, left click an image box, the borders is showing

**Fig 17 B-Scan Report**

in orange, refer to figure 17. Now select a B-Scan image in the Result Bar, the selected image will occur in the image box.

When editing Obs (refer to red square in figure 17) or Ind (refer to blue square in figure 17) contents, left click in the certain broken line box, then edit in the edit box.
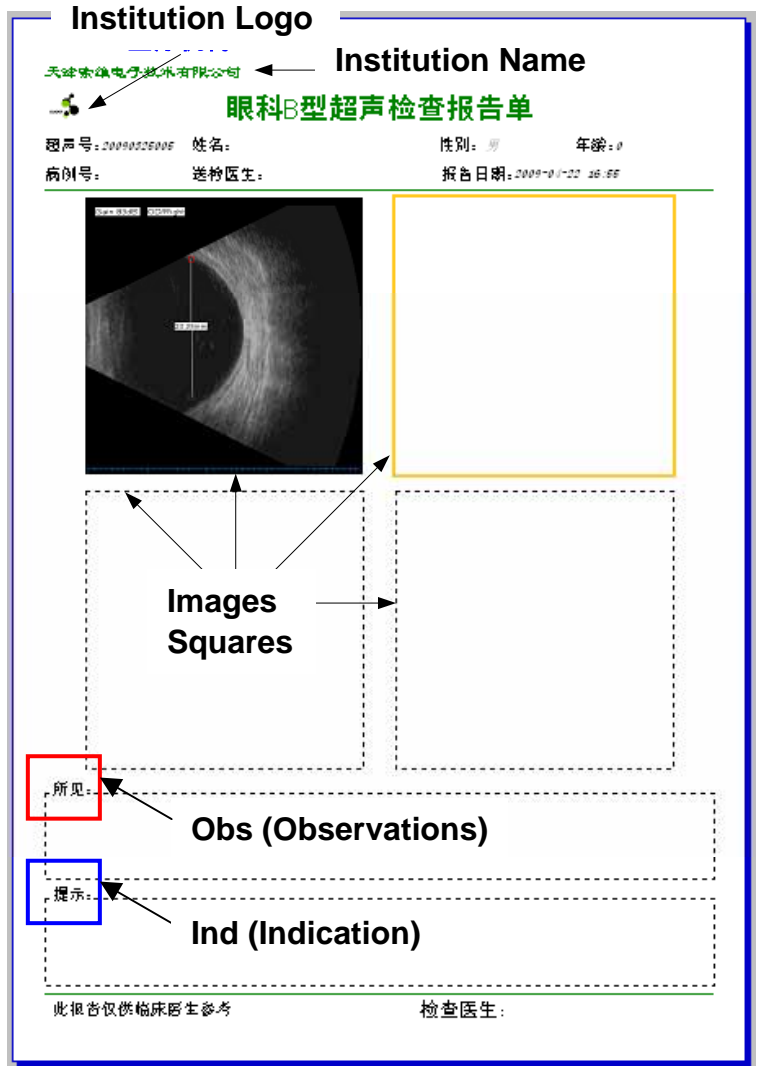
**Edit A-Scan Report**

Default A-Scan Report Page Layout is showing in figure 18. It has two image boxes to show A-Scan waveforms. The adding method is same as the B-Scan Report Page.

It includes two Result List Box for Left and Right Eye. Its contents are the same as the A-Scan sheet of the Result Bar, and will be synchronized with it automatically.

There are two IOL Calculation List Boxes in the page. Left click a box, and orange box will occur, left click the box again, a dialog will popup as shown in figure 19. Select which formula will be used and input the parameters, the calculated result will demonstrate in the list box on the left of the dialog. Click "**OK**" button can change valid in the report. Only 3 formulas' results can be shown in the list box. There are six formulas available: SRK-II, SRK-T, Holladay, Binkhorst-II, Hoffer-Q and Haigis.
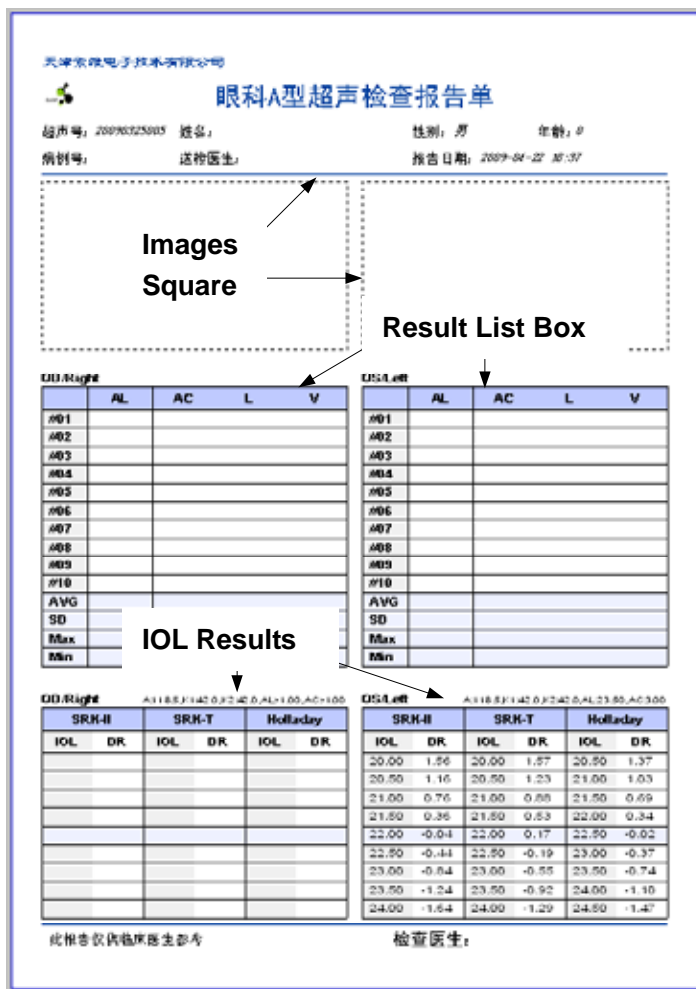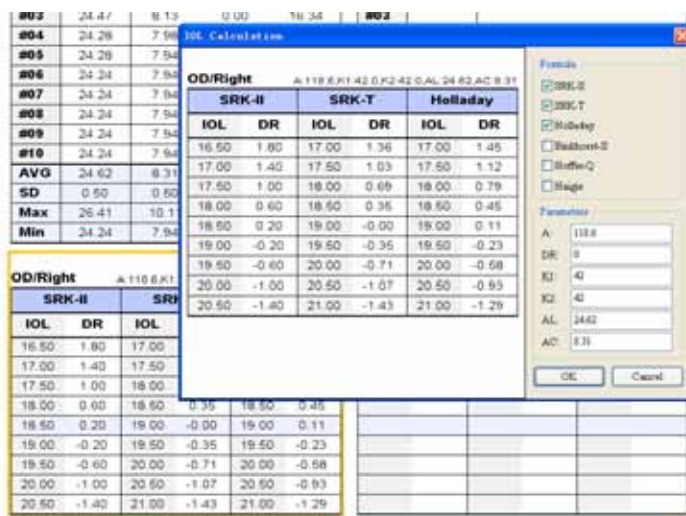


**Fig 18 A-Scan Report**



**Fig 19 IOL Calculation**

# Record Browse Mode

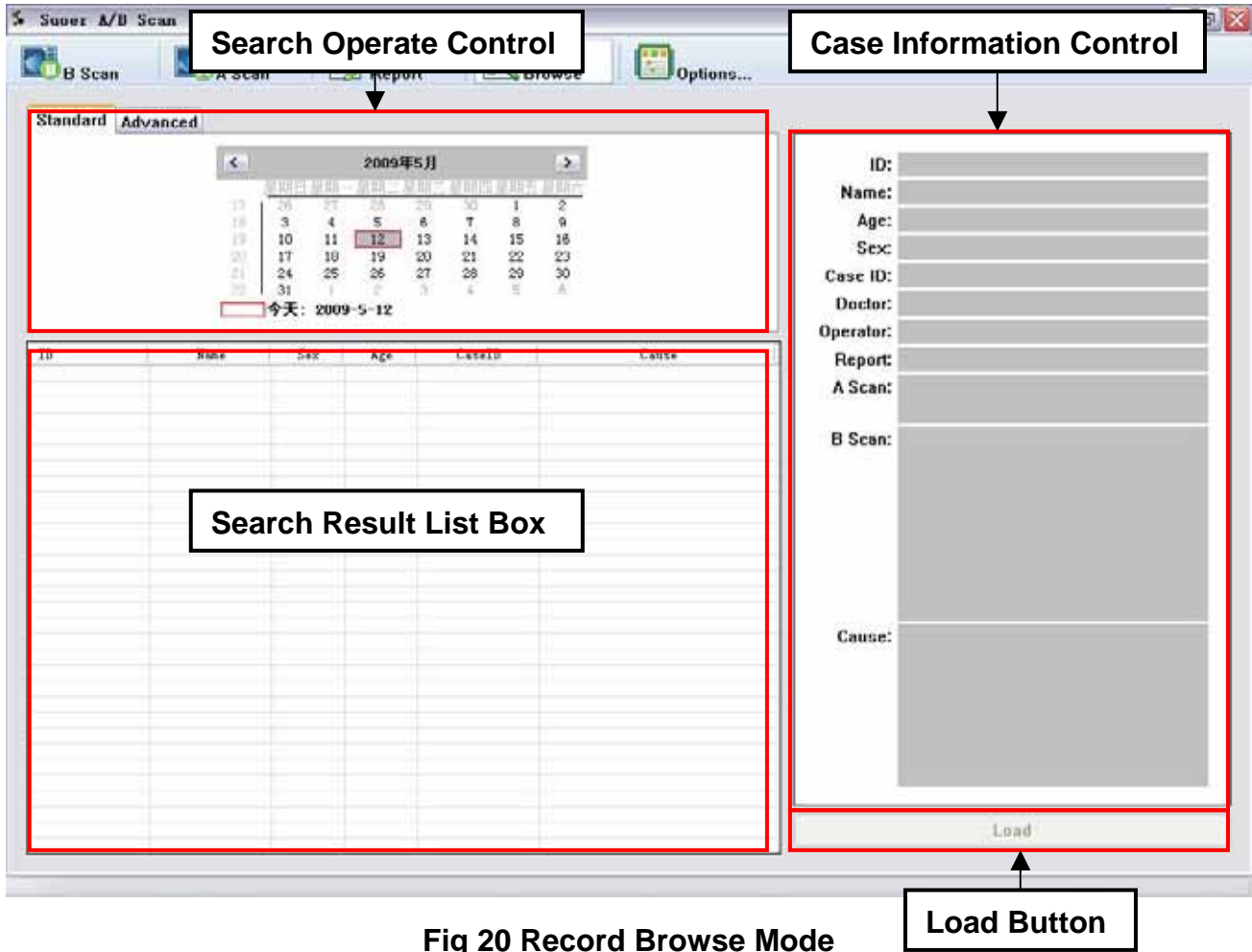In the Record Browse Mode, the users' interface is showing in figure 20.



**Fig 20 Record Browse Mode**

There are four controls in the Work Region: Search Operate Control, Search Result List Box, Case Information Control and Record Load Button. Users search records by operate on Search Operate Control, then the result will list in the Search Result List Box. Select a record in the list box, the information of a case will be shown in the Case Information Control. Information includes ID, name, sex, etc. Now Record Load Button is valid. Press the Record Load Button to load a record for further operations. Application switches to B-Scan Mode automatically, when the record is loaded.

Search Operate Control includes two sheets. Standard Sheet and Advanced Sheet. Calendar is shown in Standard Sheet for date selection. Users select a date and the record which is stored of the date will listed in the Search Result List Box.

Advanced Sheet is showing in figure 22. Users can search for the records according to

date, name, sex and age. Click "**Search**" Button to start search records, when the restrictions were ready.



**Fig 21 Advanced Sheet**

When the searching is starting, the cartoon starts moving. It stops when the searching is finished. When the application is running, the button shown as "**Stop**", click this key now can stop searching.

# Options Dialog

Click the Options Button, a dialog will popup as shown in figure 22. Users can change some options here. The tree control on the left shows the classification for options.

**General Options**   Some options marked with a "*". That means the option is valid only when the application is restarted. Users can select the language of the application's users interface here.



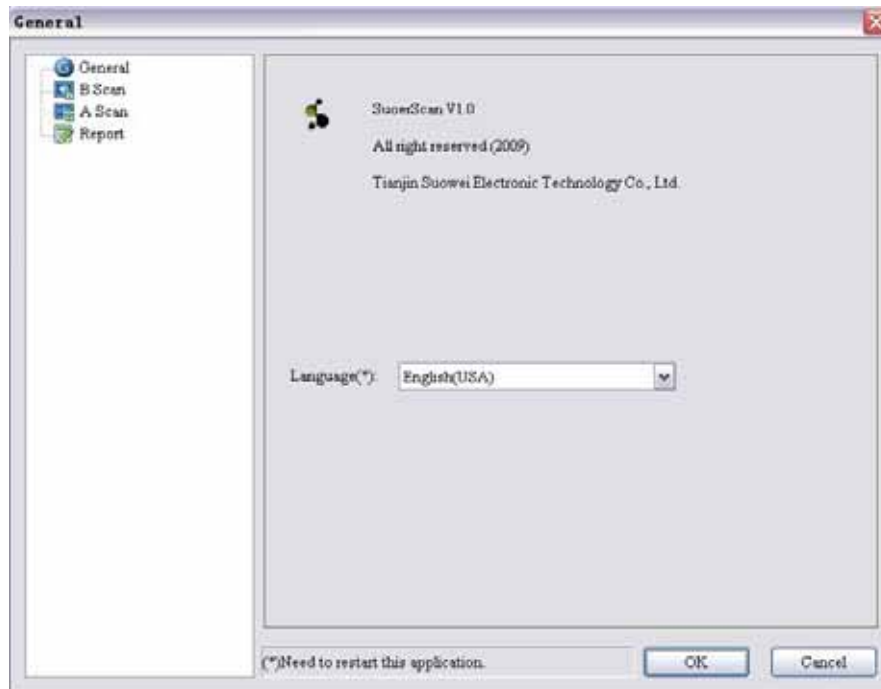**Fig 22 General Options**

**B-Scan Related Options**   Users can select whether the tags and measurement be exported with the image when exporting images. Whether frame mean technology is used when sampling can also be changed here.
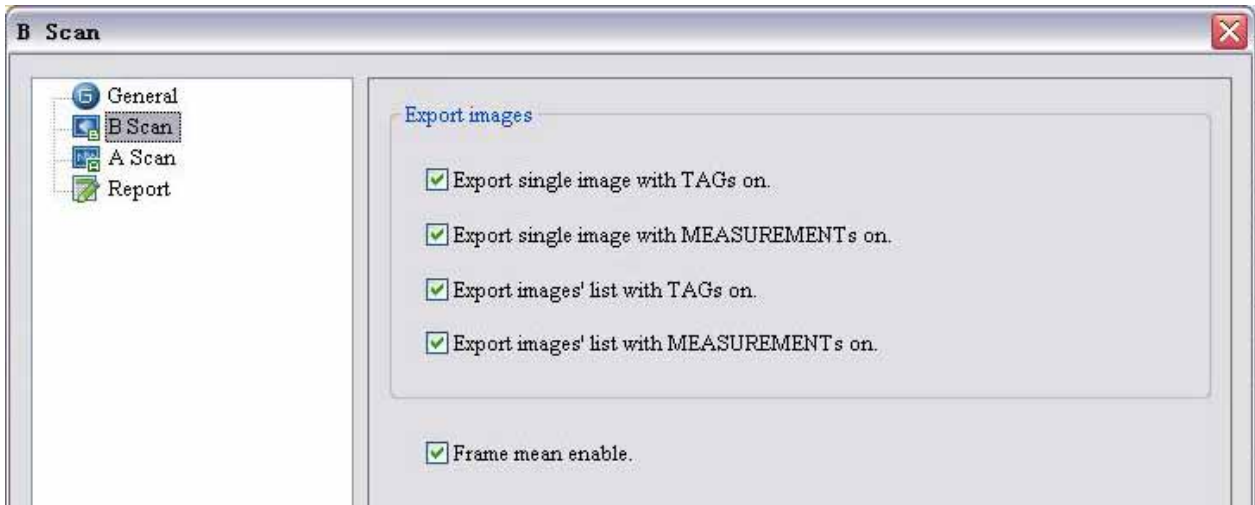


**Fig 23 B-Scan Related Options**

**A-Scan Related Options**     Users can set the velocities parameters for A-Scan related calculation here.

**Notice: Factory button can restore the default parameters for the current selected eye type only.**
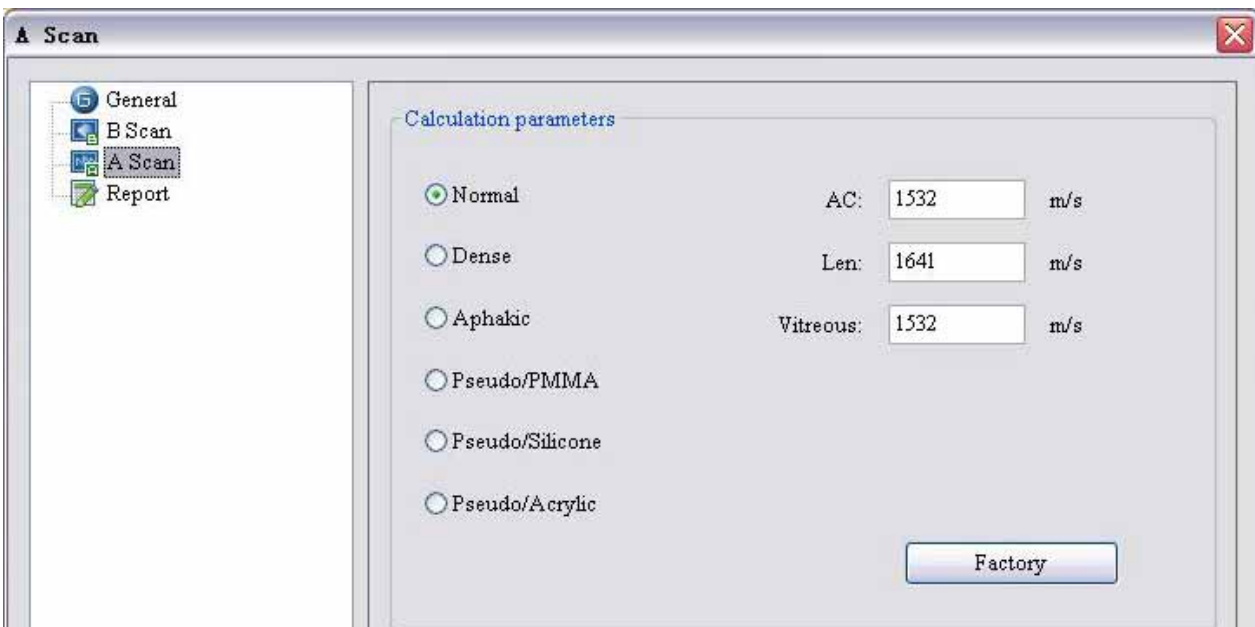


**Fig 24 A-Scan Related Options**

**Report Options**    The institution logo and the name can be set here.



**Fig 25 Report Options**

Press "**OK**" button when all the options are ready. Click the "**Cancel**" button can set all changes of the options as invalid and all the options restore to default.