



Basic BL

Version 6.5

User Manual

Nasan Medical Electronics Pvt. Ltd.

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Dear customer,

We take this opportunity to thank you for your patronage. We reiterate our commitment to live up to the confidence you have shown in us. Our continued endeavor is to exceed your expectation by offering you products that have optimum features and reliable, high quality performance backed by prompt technical support.

It is our pleasure to give you this user manual. Please study the same thoroughly before using the system.

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**NASAN**

Understanding the billion hearts of India

User Manual for

ST-Win-Basic BL

The complete Window's based Stress Test machine.

1. Introduction-

Nasan Medicals has pioneered PC based medical equipments in India. We thank you for purchasing our ST-Win, a stress test machine.

The system records and enables review of electro-cardiogram; arrhythmic disorders and diagnosis of stress induced ECG.

The distinctive feature of ST-Win is the full frequency response from 0.05 Hz to 100 Hz.

Nasan's ST-Win system-

Nasan's ST-Win system is a new generation computerized stress test system based on the latest technology. The system is designed to facilitate you to conduct cardiovascular stress testing in a user friendly and precise way.

The system consists of the following modules,

- ❖ ST-Win acquisition unit
- ❖ Interconnection cables
- ❖ Treadmill
- ❖ Central processing unit (PC)
- ❖ Display monitor-**14 inches**
- ❖ Keyboard
- ❖ Mouse
- ❖ Printer

System features-

Nasan's ST-Win System is most accurate and economic system with special features as below:

- ❖ ***Simultaneous 12 lead ECG acquisition and processing.***
- ❖ ***Digital signal processing for removal of base line wanders and power line noise removal.***
- ❖ ***Standard, manual and user made Protocol can be used to acquire the ECG.***
- ❖ ***Automatic or user selectable fiducial points.***

The user can change the E, J and post J points during acquisition and also while reviewing the test.

- ❖ ***Facility to record Un-averaged ECG at request.***

At any instant, user can record un-averaged ECG.

- ❖ ***Facility for Rhythm recording at request.***

- ❖ ***Online printouts.***

During the test, the user may request for a raw ECG and Linked median printout at any instant and print selected median report at review stage. He will get printouts according to the pre-configured stage report protocol.

- ❖ ***Post-test review and editing of results.***
- ❖ ***Facility for user defined protocols along with standard protocols.***
- ❖ ***High-resolution printouts on ordinary paper resulting in lower operating cost since the user can take print with or without grid on plane paper.***
- ❖ ***Editable summary report.***
- ❖ ***Beep on QRS.***

2. System requirement-

Requirement of PC for ST-Win system:

1. Motherboard : Recommended
Make : D-Link, ASUS, INTEL, HIS.
Chipset : Intel, VIA.
Speed : FSB, 400MHz. and onwards.
2. CPU : Recommended
Make : Intel P-5, Speed 2.4 GHz. 400 FSB.
3. RAM : Recommended
Make : Symtronics, Hyundai, Transcend.
Size : 512 MB.
Speed : 266MHz.
4. Serial Ports (RS – 232) : Two working serial ports, one for mouse and other for ST-Win acquisition unit.
5. VGA card : 64 bit, 2 MB memory PCI VGA card.
6. Monitor : **14"** color monitor
7. SMPS : Recommended
Make : Priya, Mercury, and Intex.
Capacity: 300 Watt.
8. Hard disk : Recommended
Make : Seagate.
Size : Barracuda 40GB 7200 RPM.
9. Display Settings : Resolution - 1024 X 768.
10. Key board : with 101 keys.
11. Mouse
12. Operating system : Windows XP
13. 1 KVA stabilizer.
14. CD ROM : Recommended
Make : LG. Samsung Sony, ASUS.
Type : Speed 52X.
15. Printer : Recommended
Type : HP Laser Jet 1000, HP Laser Jet 1010,
HP Laser Jet 6L Gold/ Pro.
16. Independent earthing connection.

3. Configuring the ST-Win system-

WARNING:

System 'POWER ON' sequence:

1. Switch 'ON' PC.
2. Switch 'ON' 'St Win' Unit.
3. Switch 'ON' Treadmill.

Strictly follow above sequence for safety.

When the application is started, dialog box as shown in fig. 3.1 is displayed, which asks you to configure the software as per the requirement. It is necessary to configure the system before conducting a test. Configure your PC as per instruction given in the dialog box for the best results.

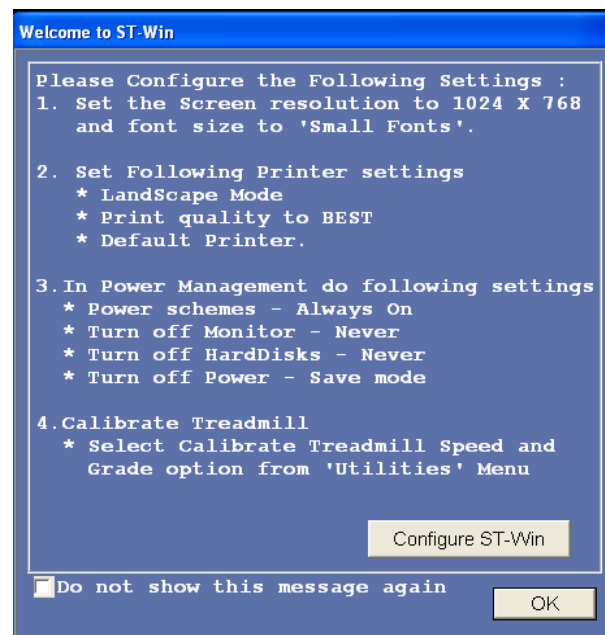


Fig 3.1: Installation dialog box.

- For setting monitor resolution to 1025x768 use the procedure given below:
 1. Go to the Windows "**Start**" menu.
 2. Select "**Control panel**" option.
 3. Double click on "**Display**" icon.
 4. A window named "**Display Properties**" is displayed on screen.
 5. Select "**Settings**" tab.
 - Set Desktop area to 1024 x 768.
 - Set Color pallet to 16 bits hi colors.

9. Click the "**Apply**" button

10. Press '**OK**'.

- **Printer Setup-**

To set the printer-

1. Go to Windows "**Start**" menu.
2. Select "**Control Panel**" option.
3. Double click on "**Printer and Faxes**" option.
4. Right click on the printer icon and select '**Properties**' option.
5. Set following properties for the printer
 - Landscape Mode
 - Print quality to '**BEST**'
 - Page size to '**A4**'.

Configuring the System

For configuring the ST-Win system go to '**Configure**' menu or press '**Configure System**' button on '**Welcome to ST-Win system**' **dialogue box**' which provides allows following tools listed as in fig.3.2,

1. Hospital configuration.
2. Referring Doctor
3. Standard summary report.
4. ST-Win configuration.
5. Treadmill Protocol.
6. Printing details.
7. Mail Account Detail

Hospital configuration-

This option from the '**Configure**' menu provides facility of storing the list of doctors and the consultant doctors attached to your hospital.

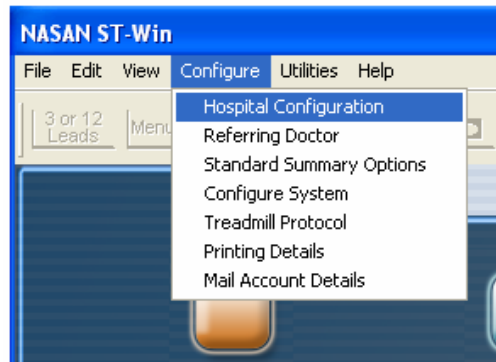


Figure 3.2: Configure Menu

This list gets popped up in the Patient details entry dialog box, from where you can select the concerned doctor for the patient.

For entering the details follow the following steps.

1. Select the '**Hospital configuration**' option from the '**Configure**' Menu.
2. A window will appear on the screen as shown in fig. 3.3.
3. Enter hospital name in the upper edit box.
4. Enter hospital address.
5. Enter the name and designation of a doctor you want to add to your list and click the '**Add**' button.
6. To delete any doctor from the list, select the corresponding Sr.No. and click the '**Delete**' button.
7. Double-click on Sr.No. to change or modify any doctor's details.

Sr.No	Name	Designation
1	rr	rr
2	Dr. Amit	M.D.

Figure 3.3: Hospital configuration

8. After entering the entire information click on "**OK**" to save the contents in the list.

9. Press "**Cancel**", the information will not get saved.

2. Referring Doctor

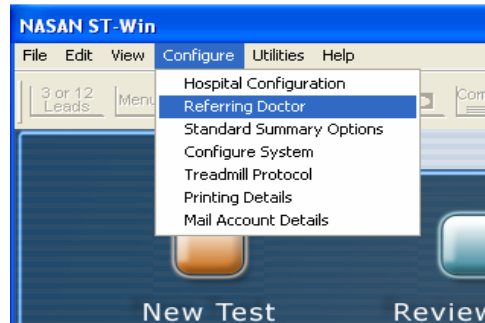


Figure 3.3B: Referring Doctor Configuration

This option from the 'Configure' menu provides facility of storing the list of referring doctors. This list gets popped up in the Patient details dialog box, from where you can select the concerned referring doctor for the patient.

For entering the details, follow the steps.

1. Select the '**Referring doctor details**' tab from the '**Configure**' Menu.
2. A window will appear on the screen as shown in fig. 3.3C
3. Enter the reference doctor's name and designation you want to add to your list and click the '**Add**' button.
4. To delete any doctor from the list, select the corresponding Sr.No and click the '**Delete**' button. The selected doctor will be deleted.
5. To change or modify any doctor's details double-click on Sr.No & click the '**Modify**' button.
6. After entering the entire information click on "**Apply**" button to save the contents in the list.
10. Press "**Cancel**", the information will not get saved.

A screenshot of the 'Configure Referrer Doctor Info' dialog box. It has two text input fields at the top: 'Reference Doctor's Name' and 'Reference Doctor's Designation'. Below them is a table with three columns: 'Sr.No', 'Name', and 'Designation'. The table contains one row with '1', 'shirin Taralkar', and 'M.D.'. At the bottom, there are five buttons: 'Add', 'Modify', 'Delete', 'OK', and 'Cancel'. A note at the bottom says 'Double click on the record you wish to modify.'

Figure 3.3C: Referring Doctor Configuration

3. Standard summary option editor-

Standard options are used while preparing summary report, which can be pre configured using '**Standard summary option editor**'

To use this option, click '**Standard summary option editor**' from '**Configure**' menu. Some standard field contents are already filled for your convenience. To add your personalized field contents in any of the objects, follow the steps given below.

Figure 3.4: Standard summary option editor.

1. Select '**Field name**' from the list and type the new contents in the edit box and press '**Add**' button. Your new field content will get added to the list.
2. In order to modify your field contents **double-click** the item you wish to modify from the list of field contents. The item will appear in the Field Contents edit box. Make changes in the content as per your requirement and press '**Modify**' button. The changed item will appear in the list.
3. To remove any of the personalized field contents item, click the item from the Field Contents list that is to be deleted and press the '**Delete**' button. The item gets deleted from the list after confirmation.
4. To save the changes and exit click on '**OK**' button.
5. Click '**Cancel**' to discard the changes.

4. Configure ST-Win-

'**ST-Win configuration program**' allows you to configure different display and print options.

To configure the system select '**ST-Win configuration**' option from '**Configure**' menu. The screen as shown in fig.3.5 is displayed.

1. Select the speed unit for treadmill to '**Kilometers per hours**'.
2. Configure treadmill speed at exercise stop to '**1.2 kmph**', '**Slow-0 kmph**', '**Fast-0 kmph**', as per the requirements.

3. To configure '**ST level lead in the summary report**'; select the required lead from the 12 leads dropdown list box. ST level lead of the selected lead is displayed in the Summary report.

Configure ST-Win

Speed Unit: kmph

TM Speed At Exer. Stop: 1.2 kmph

ST Level Lead In Summary: I

Long Lead In Reports: V5

Screen Display Leads: I, II

Trend Report Leads: I, II, III

Stage Report Leads: V5, V5, V5, V5, V5, V5

Treadmill: Treadstar XP

COM Port for amplifier: COM1

Median update time in seconds: 1

☒ Advance stage

☐ Set Trace-I lead same as AUTO Enlarged Median

☐ In linked median report print long lead having maximum ST depressionnn.

☐ Automatic Print Selected Median Report

☐ Change Paper Orientation to LandScape

Advance ... OK Cancel

Fig.3.5: ST-Win configuration program.

4. To Configure Trace1 and Trace2 leads on acquisition screen, select required '**Screen display leads**' leads from list of 12 leads.
5. To configure leads for printing ST Slope, ST Level and J-Amplitude trends, select required '**Trend report leads**' from list of 12 leads.
6. **Stage report leads.** This option has 6 drop down boxes. User can select the required leads from the list. This will select the lead for printing.
7. Select '**Treadmill**' from the list box, to interface with software. The options available are '**Treadstar**', '**Compact**', '**Trackmaster**' and '**Treadstar XP**'.
8. Check the '**Advanced stage**' check box to have the facility of advancing to the next stages before completing the exercise stage as per the protocol.

9. Select the '**COM port**' as COM 1, COM2, COM3, COM4, COM5, COM6 to which Stress test amplifier is connected.
10. Check the '**Set Trace-I lead same as AUTO Enlarge Median**' option to display Trace1 lead automatically same as enlarged median lead.
11. Check the "**Print lead having maximum ST depression as long lead in Linked Median Report**" check box to print long lead with maximum ST depression in linked median report.
12. To print selected median report automatically at review stage check '**Automatic print selected median report**' takes the printout when review button is pressed. Check the checkbox for automatic printouts of selected median report.
13. Check the "**Change Paper Orientation to Landscape**" option to print report in Landscape Orientation.
14. Click 'OK' button of the ST-Win configuration program to save the settings you have made.

6. Treadmill protocol –

Some standard protocols are pre-configured in the software. But if Doctor wants to use protocol other than the standard one, select '**Treadmill protocol**' option from '**Configure**' menu. A dialogue box as shown in fig .3.8 is displayed on the screen.

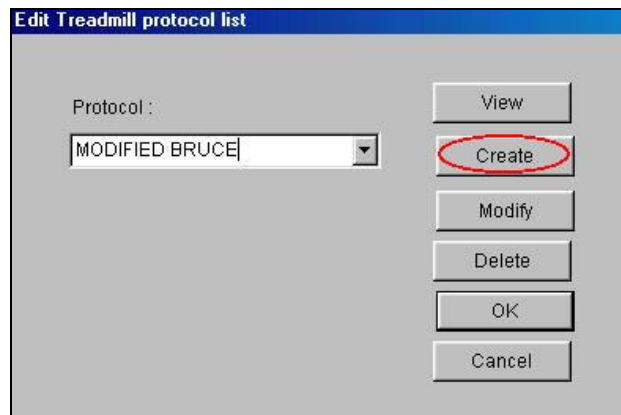


Fig.3.8: Treadmill protocol list.

1. Standard protocols are not to be modified. But the user can have a view over them by selecting a particular protocol from the dropdown list and pressing the '**View**' button.
2. To add new protocol, press '**Create**' button. A dialogue box as shown in figure 3.9 is displayed.

Create Treadmill protocol

Protocol name :

Stage No	Speed (kmph)	Grade (%)	Duration (min)
1	3.00	2.00	0004
2	3.00	3.00	0004
3	4.00	3.00	0004

Buttons: Add, Modify, Delete, OK, Cancel

Note : To modify double click on the stage. Select any stage to delete.

Fig: 3.9 Treadmill protocols creator.

3. Enter protocol name in the text box, speed and grade in the respective text boxes. To add this contains in the protocol press '**Add**' button.
4. To delete the stage, select the required stage number from the '**Stage no.**' list and press '**Delete**' button
5. To modify the stage double click the '**Stage no.**' to be modified, the stage contents will appear in the text boxes.
6. After editing the stage, press '**Modify**' button.
7. Press '**OK**' to save the change and exit.
8. Press '**Cancel**' to exit without saving.
9. To modify the user defined protocol; select the protocol name from the list and click '**Modify**' button. A dialogue box shown in fig.3.8 is displayed filled with contents of existing protocol. Make the require changes and press '**Modify**' button. Press '**OK**' button after doing required modifications.
10. For deleting any protocol from the list, select the protocol you want to delete and press the '**Delete**' button. Selected protocol is deleted after confirmation.
11. Press '**OK**' to save the change and exit.
12. Press '**Cancel**' to exit without saving.

6. Printing details-

To have the printouts of the required report, printing details option is provided. This configuration is used while printing the reports with the require titles, fonts and their sizes and alignments. You can set following details-

- Report title
- Report title alignment (either center right or left of the page).
- Fonts for report title, hospital name, Patient details and Summary report.
- Grid style.
- Color or black and white printing
- Administrative details with gray background.

- Print Admin border

For this purpose select the '**Printing Details**' option from '**Configure**' menu. A dialog box as shown in fig 3.10 is displayed.

Figure 3.10: Print page details.

To set the font, click the '**Font**' button. A dialog box as shown in fig.3.11 will appear where you can configure

- o Font,
- o Font color,
- o Font style,
- o Font size,
- o Underline the text.

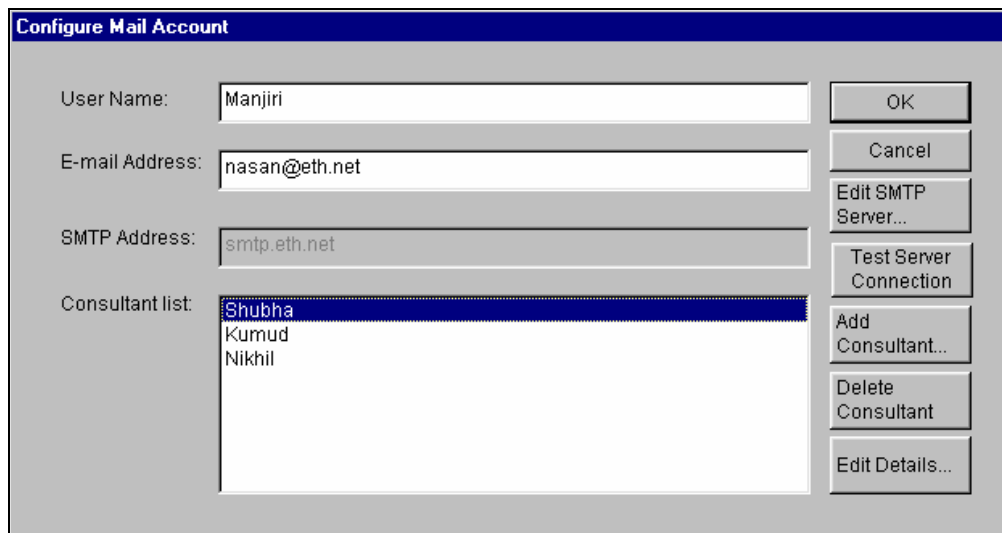
Fig.3.11: Select font.

Press '**OK**' button to save the settings and exit.

Press '**Cancel**' to exit without saving.

7. Mail account details-

The software has a facility of mailing the marked pages to consultant. The mail addresses of the consultant doctors, select from '**Mail account details**' of '**Configure**' menu option. The screen displayed in the figure 3.14 will appear on the screen.



The screenshot shows a dialog box titled "Configure Mail Account". It has four input fields on the left: "User Name:" with the value "Manjiri", "E-mail Address:" with "nasan@eth.net", "SMTP Address:" with "smtp.eth.net", and "Consultant list:" which is a list box containing "Shubha", "Kumud", and "Nikhil". On the right side, there are seven buttons: "OK", "Cancel", "Edit SMTP Server...", "Test Server Connection", "Add Consultant...", "Delete Consultant", and "Edit Details...".

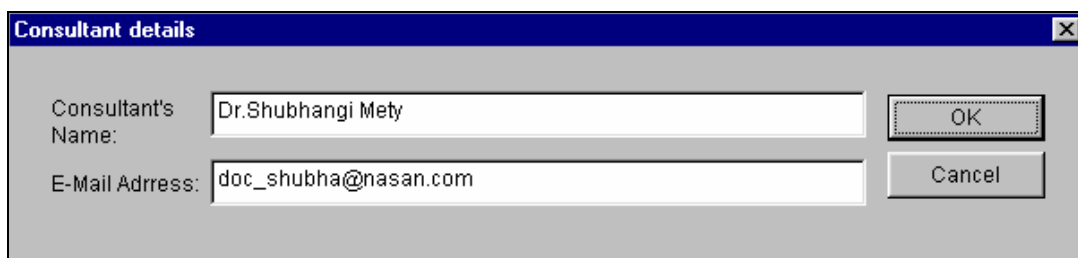
Fig: 3.14: Configure mail account.

This dialog box contains the configuration of the consultant doctors. Enter the senders name in User name field and Senders E-mail Address in E-mail Address filed.

SMTP Address is the SMTP address of the user's mail account. SMTP addresses of some mail accounts are given in "**Help**" menu.

To test the server connection press "**Test server connection**" button. This will give you the message weather the server connection is working or not.

To add Consultant in the consultant list click '**Add Consultant**' button. The dialog box as shown in the fig 3.15 will appear on the screen.



The screenshot shows a dialog box titled "Consultant details". It has two input fields: "Consultant's Name:" with the value "Dr.Shubhangi Mety" and "E-Mail Address:" with "doc_shubha@nasan.com". On the right side, there are two buttons: "OK" and "Cancel".

Fig.3.15: Consultant details.

Enter the consultant doctor's name and also his/her E-mail Address. The doctor name will get displayed in the list. This list is displayed while sending the reports.

4. Conducting a test-

To start a new test for a patient, click on the '**New Test**' button present on screen or go to '**File**' menu and select '**New test**' option.

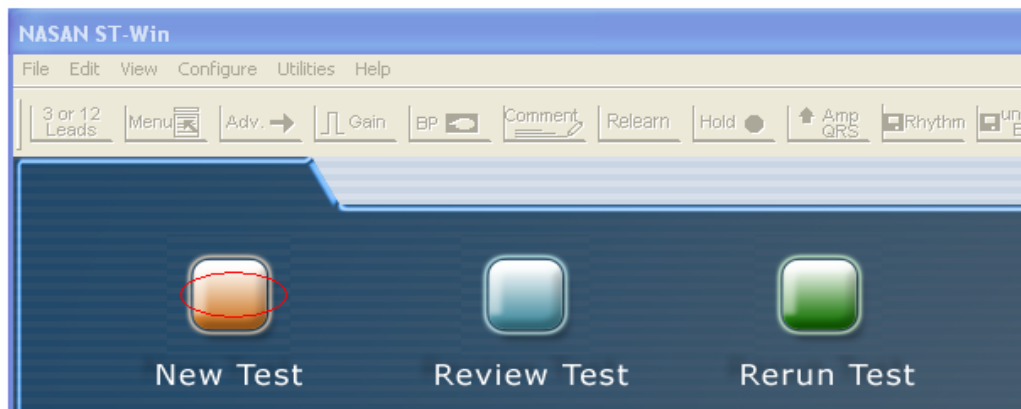


Fig.4.1: Main screen.

Following patient information dialog box as shown in fig. 4.2 is displayed for entering the patient details.

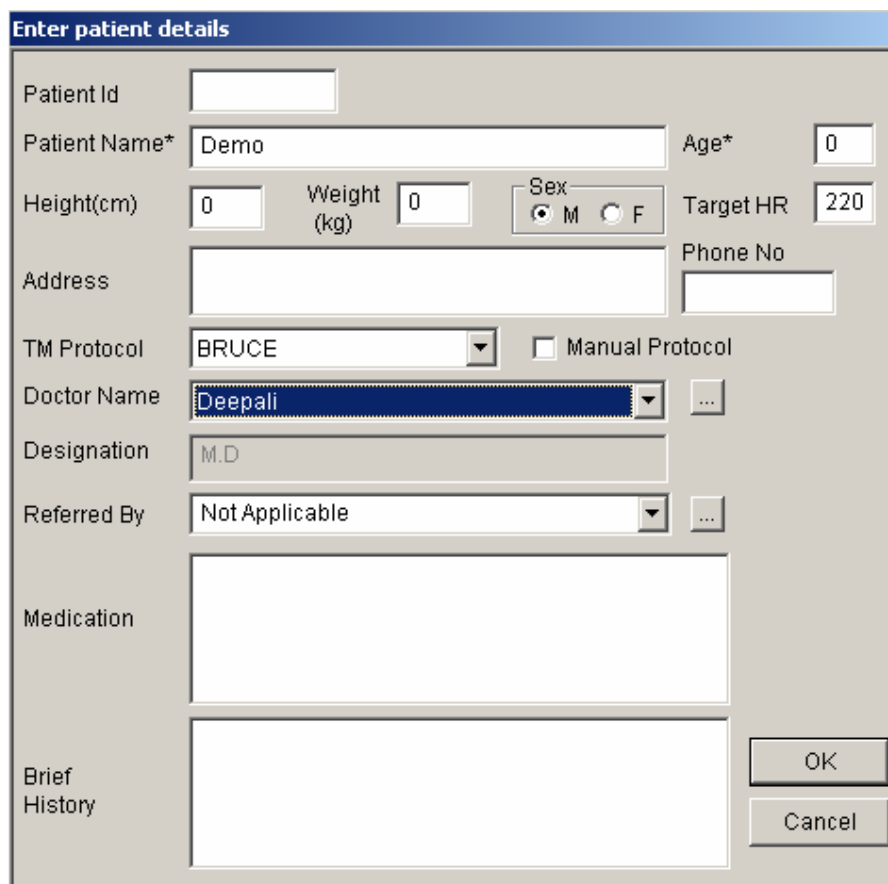


Fig. 4.2: Patient information.

1. Editable target HR facility is given in patient detail dialog box.

- Click '**OK**' button to start the acquisition. An acquisition screen is displayed as shown in fig 4.3.

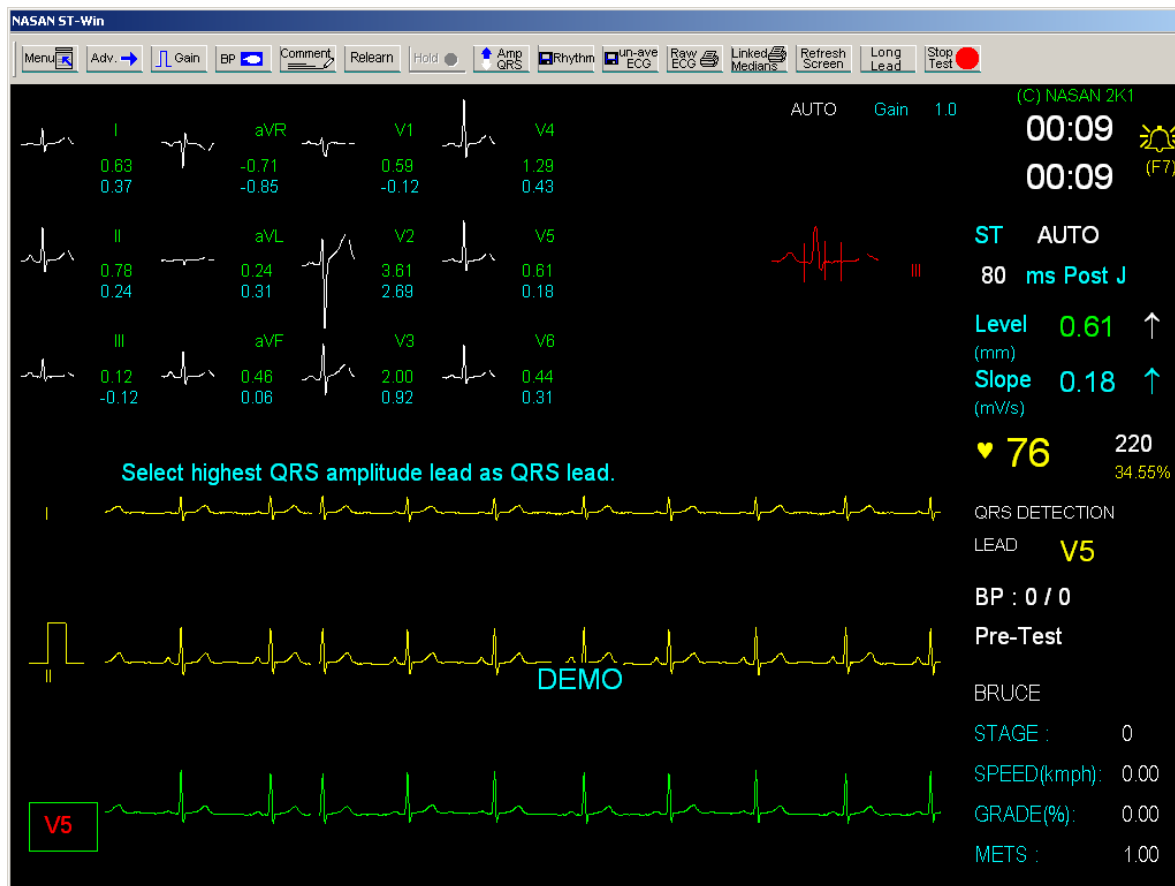


Fig. 4.3: Acquisition screen.

You will see following details on Acquisition screen

- Tool bar at the top of screen.
- 12 Leads medians
- 3 running ECG traces.
- 1 enlarged median with E, J and post J points marked.
- The parameters like gain, Start time, Phase time, ST auto, 80 ms Post J, ST level, ST slope, HR, QRS Detection lead, Blood pressure, Stage, Protocol name, Protocol stage, Speed, Grade, Mets.
- Beep is sound on every detected QRS. To set QRS beep ON or OFF, press F7 key, QRS beep status is toggled. Bell symbol on screen indicates the ON/OFF status of QRS beep.

Tool bar at the top of the screen have following controls-

- 1. Menu.**
- 2. Adv (Advanced stage).**
- 3. Gain.**

4. **BP.**
5. **Comments.**
6. **Relearn.**
7. **Hold.**
8. **Rhythm.**
9. **Un-avg ECG (Un-averaged ECG).**
10. **Amp QRS (Amplify QRS).**
11. **Raw ECG.**
12. **Linked Medians.**
13. **Refresh.**
14. **Long lead**
15. **Stop Test.**

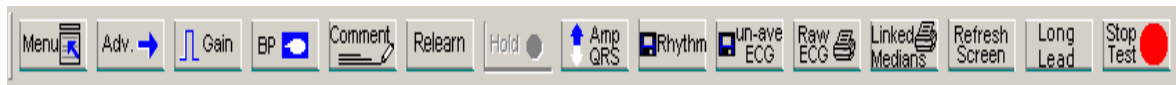


Fig 4.4: Tool bar.

1. **Menu**



Press '**Menu**' button to change the following options given in control bar shown in fig 4.6



Fig 4.6: Menu bar.

- To change the 1st ECG trace lead, press '**Trace I**' button on the menu bar.
- To change the 2nd ECG trace lead, press '**Trace II**' button on the menu bar.
- To change the QRS detection lead (green color trace), press '**QRS Lead**' button on the menu bar.
- Press '**Lead sets**' to replace all the three traces by the next three consecutive traces.
- Press manual median button to toggle the auto or manual selection of change median. To select enlarged median display lead manually, Press '**Manual Median**' button. The caption of '**Manual Median**' button changes to '**Auto Median**' as shown in fig 4.7. Click "**Change Median**" button to select next lead.
- Click "**Auto Median**" button to automatically select enlarged median lead same as the lead having minimum ST level.

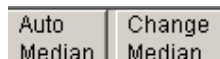


Fig 4.7

- To change the position of E, J, Post J points, press the '**Manual points**' button. Three buttons named E-Point, J-Point, Post J Point gets enabled on the menu bar as seen in the fig 4.8

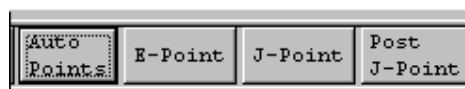


Fig 4.8

- Press '**E-point**' button to change the position of E-point to left or right press the '<' or '>' button as shown in fig 4.9 respectively. Similarly press J-point and Post J-point button to change the position of J-point and post J-point respectively.

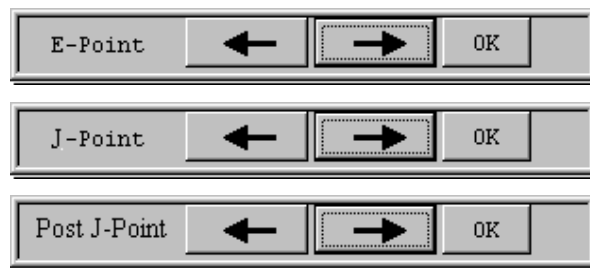


Fig 4.9

- Press '**OK**' button to go back to main tool bar by saving the changes done in the positions of the points.
- In all stage user can increase or decrease the '**Speed**' and '**Grade**' of the treadmill. Press '**Speed**' or '**Grade**' button to change the speed and grade of the treadmill. Speed and Grade can be varied up to first stage of BRUCE protocol using up and down arrow keys as shown in fig 4.10



Fig 4.10

By pressing the arrow buttons doctor can increase or decrease the speed and grade of the treadmill.

- When the test reaches to recovery stage '**Peak median**' button gets enabled in menu option, which is visible in 3 lead acquisition screen only as shown in fig 4.11 and fig 4.12. This button provides the facility to compare the current median with the basal median or peak exercise median.

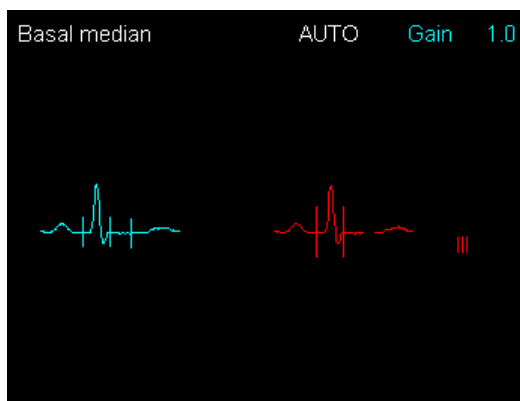


Fig: 4.11 Basal median

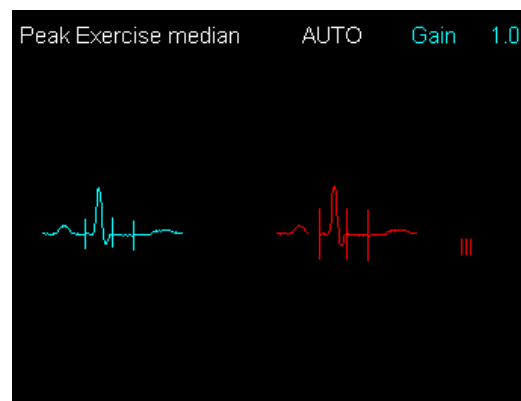


Fig: 4.12 Peak Exercise Median.



- If the Filter ON /OFF facility is required by the user only then FILTER button is visible on the menu bar. Using **Filter ON** or **Filter OFF** buttons the user can select the filtered or non-filtered ECG.

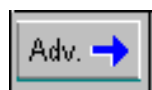


Click this to switch ON filter



Click this to switch OFF filter

2. **Adv (Advanced stage)**



Press '**Adv**' button to go to the next stage. The advanced stage button is used when you want to switch over from present stage to next stage according to the protocol as shown in fig 4.13 & 4.14. Prev stage should be wait for exercise.

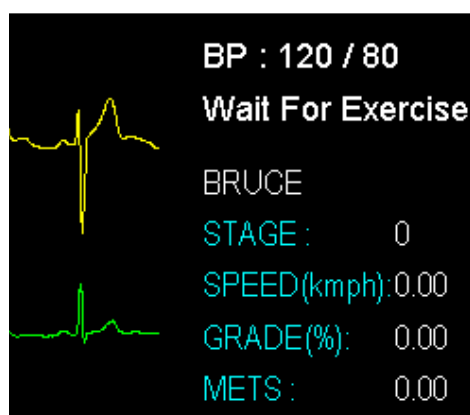


Fig: 4.13 Before Advance stage.

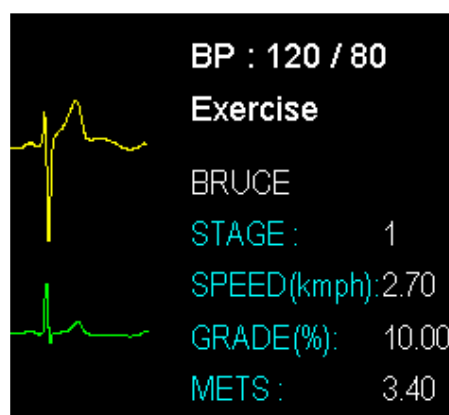
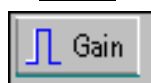


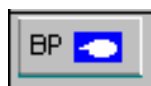
Fig: 4.14 After Advance stage.

3. **Gain**



Press the '**Gain**' button to change the gain of the traces. Press the gain button, the gain value toggles between 0.5, 1.0 and 2.0. Current gain value is displayed on right corner of the screen. ECG traces and median are drawn with new value of gain.

4. **BP**



You can enter the BP of the patient when the test is going on by pressing the '**BP**' button as shown in fig 4.15. Fifty seconds before end of each exercise stage, this BP entry dialog box is automatically shown to enter the BP.

Systolic	120	Diastolic	82	OK
----------	-----	-----------	----	----

Fig.4.15

5. **Comments**



When the '**Comment**' button is pressed, a text box is displayed as shown in fig.4.13 .You can enter comments at every stage. Press '**OK**' button to save the comments and '**Cancel**' button to exit as shown in fig 4.16.

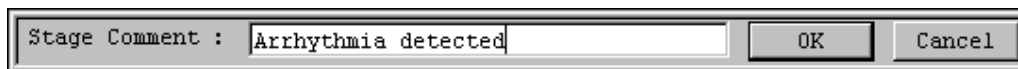
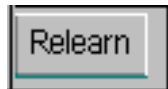


Fig 4.16

6. Relearn



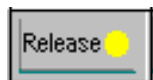
If there is noise on ECG traces because of loose electrode or some other reason, median calculations go wrong. Press electrode; wait till traces get stabled and then press '**Relearn**' button to recalculate the medians.

7. Hold



Press '**Hold**' button to hold the exercise stage while acquisition. When this button is pressed the present stage duration gets increased until release button is pressed.

8. Release



Release button takes place of '**Hold**' button when a test is hold. It remains in its place until it is pressed to release the test. Then this '**Release**' button is pressed it changes to '**Hold**' button again.

9. Amp QRS (Amplify QRS)



In case of short R-waves heart rate calculations go wrong. Press '**Amp QRS**' button to amplify the QRS-lead for calculations (display gain will not change).

10. Rhythm



Press '**Rhythm**' button to save 10 sec ECG of all leads. Saved Rhythms can be reviewed in Review.

11. Un-Avg (Un-averaged ECG)



Press '**Un-avg ECG**' button to save 5 sec ECG of all leads. Saved Rhythms can be reviewed in Review.

12. Raw ECG



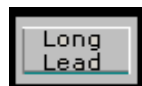
Press '**Raw ECG**' button to take printout of the raw ECG at that particular instance.

13. Linked Median



Press '**Linked Median**' button to take linked median printouts of that particular instance.

14. Long lead



Press Long Lead button. Following menu with lead names will be displayed.



Select desired long lead. Selected lead will be printed in linked median report at the time of acquisition.

15. Refresh



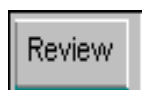
This button is present on monitor no 2. This button is provided to refresh both screens.

16. Stop Test



Press '**STOP Test**' button to stop the treadmill and also to stop the test. If '**STOP Test**' button is pressed before reaching the exercise stage, the test will not be saved. Press F5 key to stop the test from keyboard.

17. Review



When the test reaches the recovery stage '**Review**' button is displayed on the toolbar in place of '**STOP Test**' button. By pressing the '**Review**' button you can directly go to review screen by completing recovery state of the test.

5. Reviewing the test-

To analyze the data recorded after taking a test, select '**Review test**' from '**File**' menu .

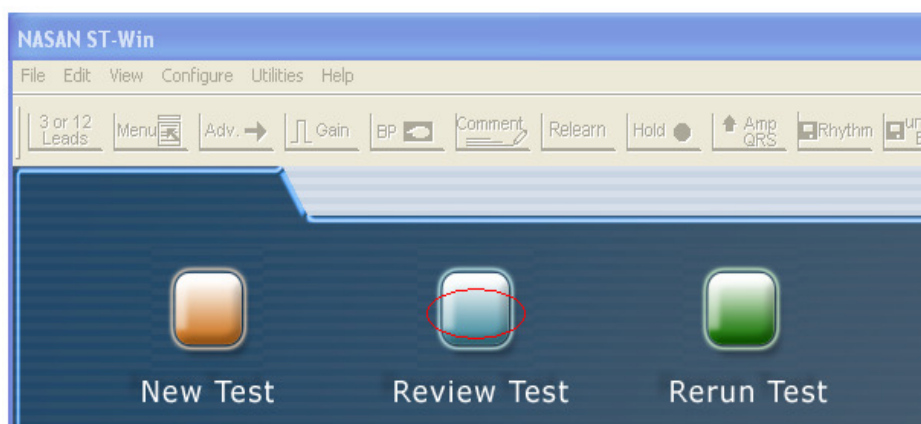


Fig: 5.1 Main screen

Patient list as shown in fig. 5.2 is displayed. Select the patient to review and press 'OK' button. Review screen as shown in fig. 5.3 is displayed.

You can delete the test by selecting the patient from the list and pressing '**Delete**' button. The application ask for confirm action before deleting the test.

If you click on '**Patient name**' button then the patient files are sorted alphabetically. If you click on '**Age**' button then the patient files are sorted according ascending order according to age of the patient. Similarly you can sort the patient files according to sex, ID and date by clicking respective buttons.

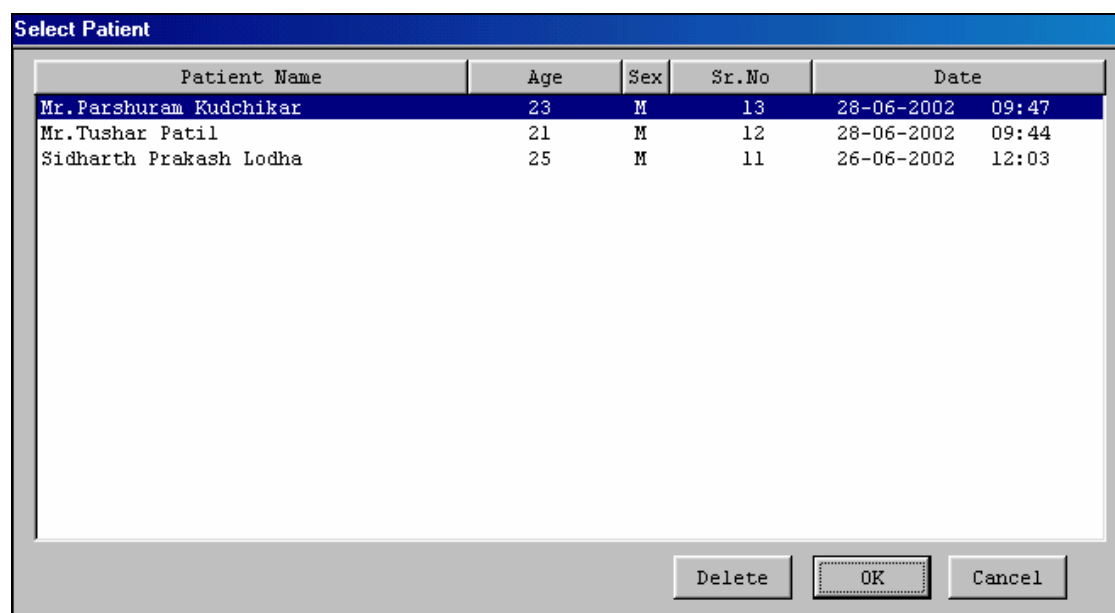


Fig: 5.2 Patient Details.

Review screen has the following data on the screen,

- Medians of all 12 leads.
- Heart rate trend.
- Review control panel.

Review control panel has following information on it -:

- Time in min. at which the arrow is positioned.
- Heart rate in beats per minutes.
- Blood pressure in mmHg.
- Speed in kmph/mph.
- Grade in %.
- METS.
- Protocol name.

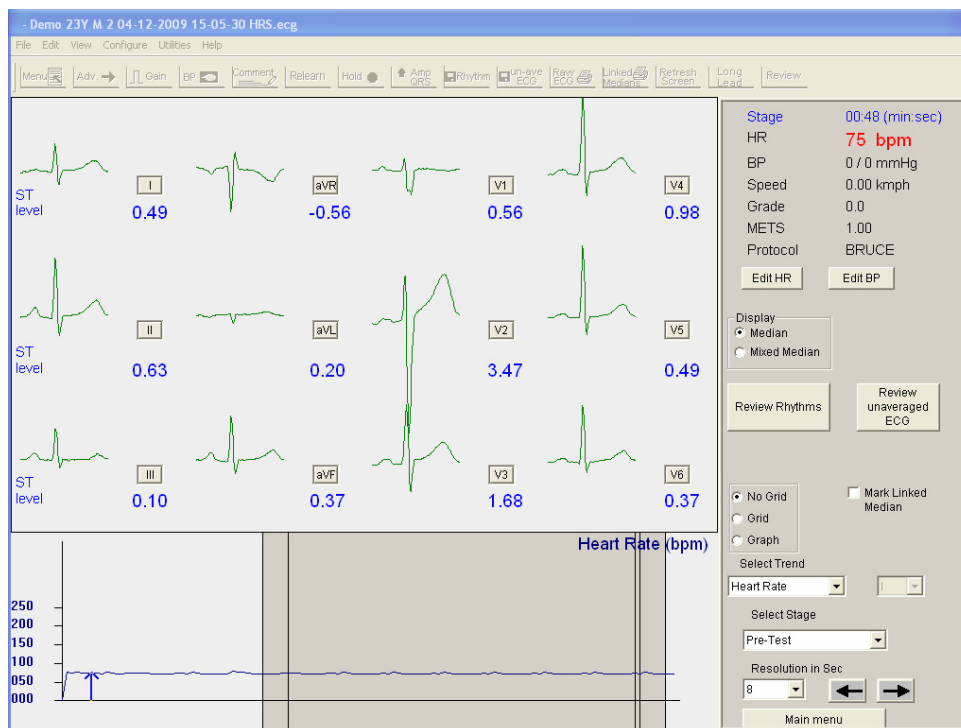
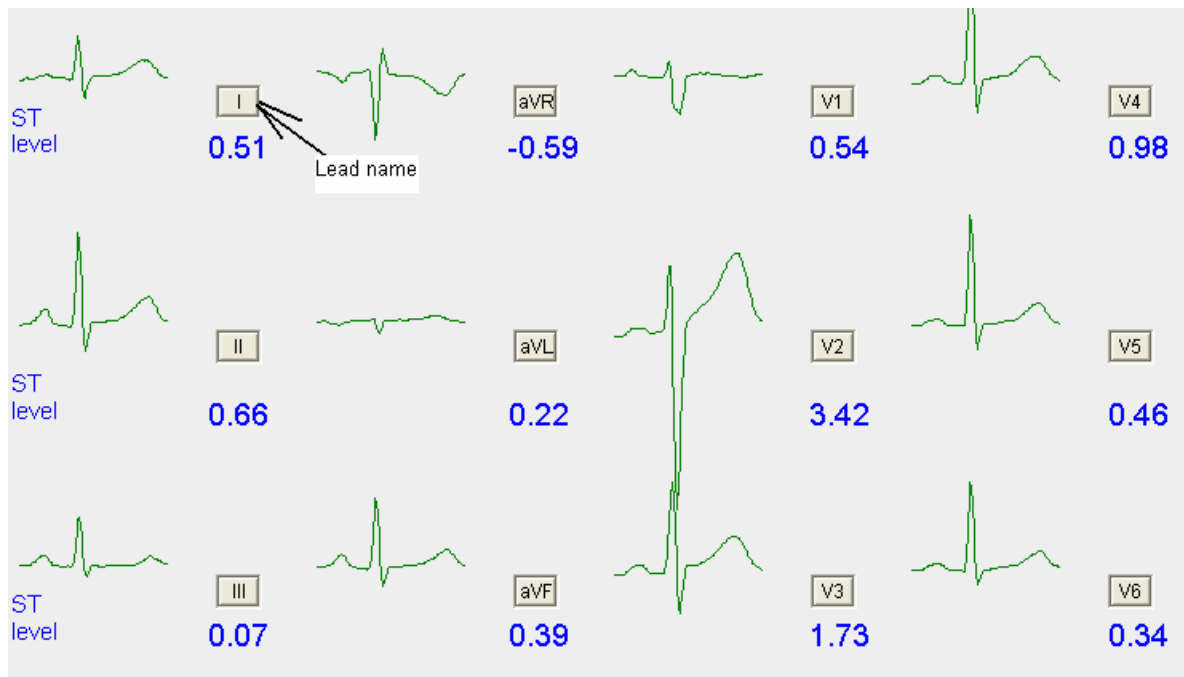


Fig: 5.3 Review screen.

Review screen ---Medians of all 12 leads



To view zoom medians and edit E, J and Post-J points, press lead name button adjacent to median. Dialog box as shown below will appear on the screen. The pressed lead is enlarged and displayed.

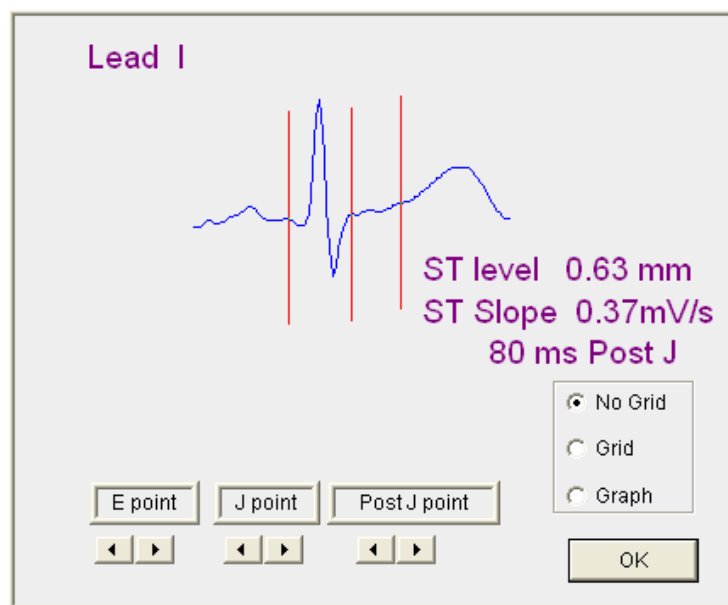


Fig: Zoom median.

- E, J and post-J points can be edited using arrow keys on the screen.
- Click on the Grid or Graph or No Grid buttons to display the Grid or Graph or No Grid on the screen.
- Press OK to view medians screen.

Review Control Panel

1. **Edit HR**

Press '**Edit HR**' button to enter the heart rate at arrow position. Dialog box is displayed as shown in fig 5.4. Edit the heart rate and press '**OK**' button to save the edited heart rate value. The trend of Heart rate also gets updated.

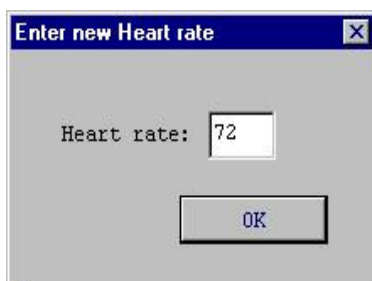


Fig: 5.4. Edit HR

2. **Edit BP**

Use this button to edit the blood pressure at current cursor position on trend. Dialog box as shown in the figure 5.5 is displayed. Enter systolic and diastolic BP values and press OK to save values. BP trend is updated accordingly.

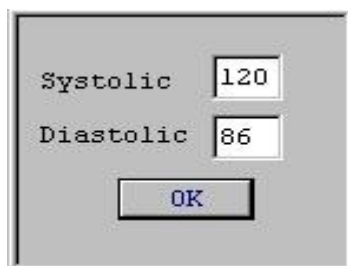


Fig. 5.5: Edit BP.

3. **Mixed Median**

To view raw ECG with medians select ECG radio button. 2.5 seconds ECG of all 12 leads with medians at current cursor position is displayed. ST levels are display below lead names.

Mark Mixed Median

This check box is provided for marking the mixed median page for printing.



Fig: 5.6.12 lead ECG screen.

4. Review Rhythms

Press '**Review Rhythms**' button to view the rhythms recorded while conducting the test. The screen is as shown in fig 5.8. This screen has following details,



Fig.5.7: Review rhythm screen.

- 12 lead ECG of 5 sec.
- Time in hrs and min. in the left corner of the screen.
- Heart rate of the patient at recorded time.

You can also select the time of recorded rhythms from the drop down time box to view rhythm stored while acquisition.

To view the ECG of any 6 lead press '**6Leads**' radio button. This will enable the lead panel. Select the leads by checking the boxes provided. The 6 lead screen as shown in the fig. 5.9. is displayed.

Click the '**Mark page**' check box to mark the page for printing.

Click on the Grid or Graph or No Grid buttons to display the Grid or Graph or No Grid on the screen.

Press "**OK**" button to return back to the main review screen.



Fig.5.8: 6 Lead review rhythm

5. Review Unaveraged ECG

To view Unaveraged ECG recorded while conducting test, press '**Review Unaveraged ECG**' button. Following screen is displayed as shown in the fig.5.9,

This screen has the following details,

1. Heart rate at the current cursor arrow position.
2. Time at the cursor arrow position.
3. Click on the Grid or Graph or No Grid buttons to display the Grid or Graph or No Grid on the screen..
4. '**Mark page**' check box for marking the current page for printing.



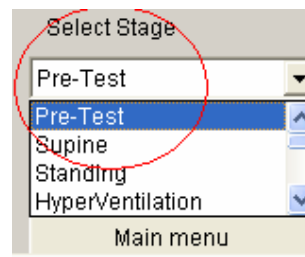
Fig.5.9: Unaveraged ECG

5. **'OK' button** to move back to the main review screen.

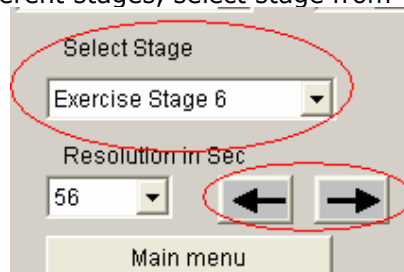
6. **Mark Linked Median**

This check box is provided for marking the linked median page ge for printing.

7. **Select stage**

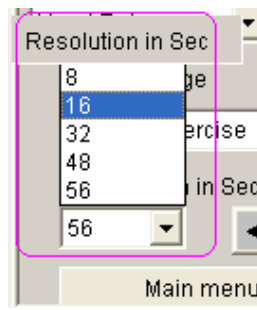


To view median at the end of different stages, select stage from **'Select stage'** combo box.



To move the arrow cursor on the trend for viewing the medians or ECG of that particular instance, use the arrow buttons. By using arrow stages can be change as shown in above figure.

8. Resolution in sec



User can select resolution using '**Resolution in sec**' combo box. Resolution can be varied in steps of 8,16,32,48 and 56. Printout will contain will have the same resolution as selected in review mode.

9. Grid and Graph

This check box is provided to view the medians with the grid or graph. It draws grid on medians if '**Median**' screen is selected or on mixed medians if '**Mixed Median**' screen is selected as shown in fig 5.11.

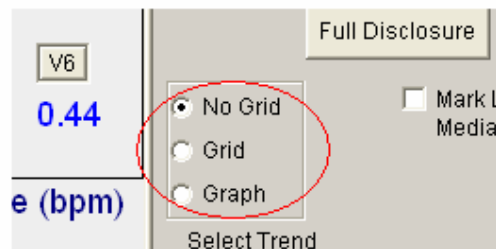


Fig 5.10: Grid or graph.

10. Select trend

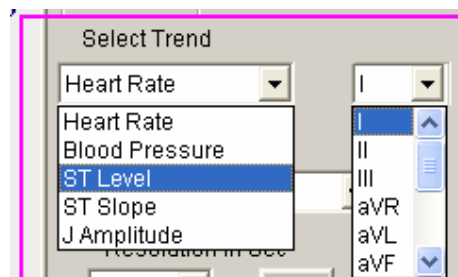


Fig.5.11: Select trend.

To view the different trends like heart rate, ST slope, ST Level and J amplitude, Blood pressure, select the trend from the select trend drop down list present as shown in figure.

11. Edit Patient Details

For making any addition or deletion or any changes in patient details go to '**Edit**' menu and press '**Patient details**' option. A dialog box as shown in fig.5.12 is displayed on the screen.

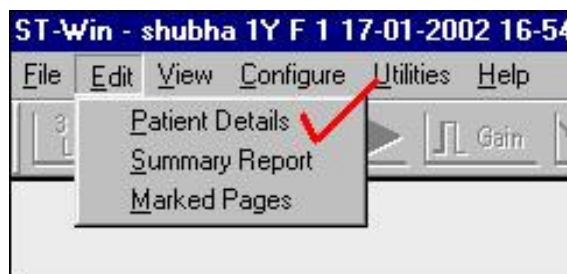


Fig.5.12: Edit menu.

Fig.5.13: Patient detail dialogue box.

You are able do required changes. Press '**OK**' button to save the changes.

12. **Save test for back up**

You can save the test for backup with the help of '**Save test for back up**' option from '**File**' menu. The test can be saved on the hard disk for later referring purpose. On clicking this option the screen as shown in fig 5.15 is displayed. Select the folder in which you want to save the test, edit the name of the test and press the '**Save**' button to save.

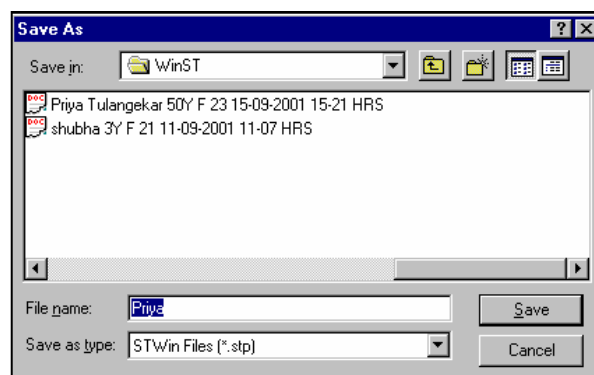


Fig.5.14: Save test.

13. **Main menu**

To go back to main screen, press '**Main menu**' button.

6. Printing reports-

1. Print setup

For setting the properties of the printer go to '**File**' menu and then select '**Printer setup**' option.

- Set following properties for the printer
 1. Landscape Mode
 2. Print quality to 'BEST'
 3. Page size to 'A4'.
- To set the printer-
 1. Go to Windows "**Start**" menu.
 2. Select "**control Panel**" option.
 3. Control Panel window will open.
 4. Double click on "**Printer and Faxes**" option.
 5. Right click on the printer icon and select '**Properties**' option.

2. Print

To have the printout of the marked pages, click on '**Print**' option from the '**File Menu**' while reviewing the patient data. Dialog box as shown in fig 6.1. is displayed. Select the reports to be printed by checking the respective check boxes. When '**Select All**' check box is checked, all the marked pages of all reports will be selected for printing.

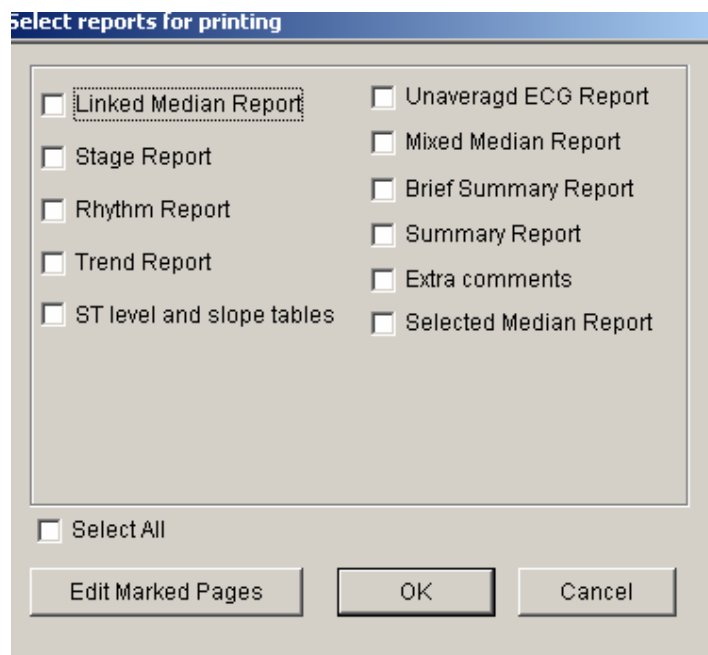


Fig.6.1: Print report selector.

- To edit the pages in the report press '**Edit marked pages**' button. Dialog box as shown in the fig 6.2 will appear on the screen.

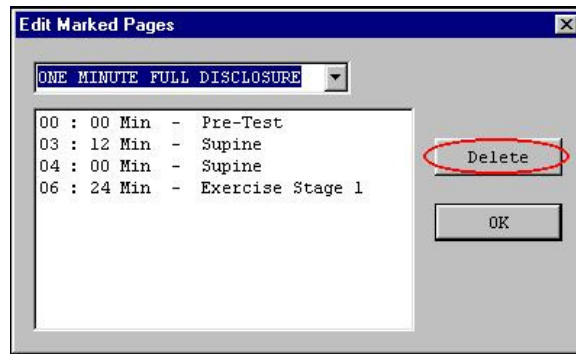


Fig: 6.2 Edit Marked pages

Select the report title from the drop down list view the marked pages of selected report.

To delete the page, select the page from list and click on '**Delete**' button. The page is deleted after confirmation. Press '**OK**' to start printing the reports.

Printing Summary Report

For editing the Summary report, go to the '**Edit**' menu and click '**Summary Report**' option.

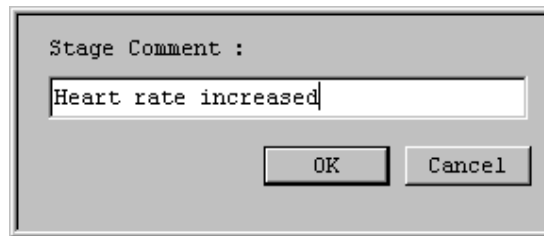
- The patient detail dialog box is displayed you can change the patient details as shown in fig.5.14.
- Press the '**OK**' button to view tabular summary report as shown in fig.6.3. In his report, stage time, speed and grade of the treadmill, Heart rate in bpm, Blood pressure in mm/Hg., Rate pressure product (R.P.P.), METS, ST level and stage comment of all stages in test are displayed.

Stage Name	Phase Time	Speed / Grade (kmph) / (%)	HR (bpm)	BP (mmHg)	R.P.P	METS	ST Level (I)	Stage Comments
Pre-Test	00:06	0.0 / 0.0	0	0 / 0	0	1.00	0.00	
Supine	00:11	0.0 / 0.0	76	0 / 0	0	1.00	0.63	
Standing	00:17	0.0 / 0.0	74	0 / 0	0	1.00	0.63	
HyperVentilation	00:22	0.0 / 0.0	74	0 / 0	0	1.00	0.63	
Wait For Exercise	00:28	0.0 / 0.0	73	0 / 0	0	1.00	0.63	
Exercise Stage 1	03:00	2.7 / 10.0	75	0 / 0	0	5.70	0.20	
Exercise Stage 2	06:00	4.0 / 12.0	72	0 / 0	0	8.00	0.15	
Exercise Stage 3	09:00	5.5 / 14.0	72	0 / 0	0	10.60	0.10	
Exercise Stage 4	12:00	6.8 / 16.0	72	0 / 0	0	14.30	0.07	
Exercise Stage 5	15:00	8.1 / 18.0	76	0 / 0	0	16.60	0.10	
Exercise Stage 6	18:00	8.9 / 20.0	73	0 / 0	0	18.90	0.12	
Peak Exercise	21:00	9.7 / 22.0	72	0 / 0	0	18.90	0.10	
Recovery 1	01:00	1.2 / 0.0	73	0 / 0	0	1.00	0.12	

* Double click on stage to modify the Stage Comment

Fig 6.3: Tabular summary report

- In the comment list, the comments entered while acquisition of the test, are displayed. If any comment is suppose to be entered or changed, double click on the stage. A dialog box as shown in the fig 6.4 will appear on the screen. Enter the comment or change the comment and press '**OK**' button to save the comment.



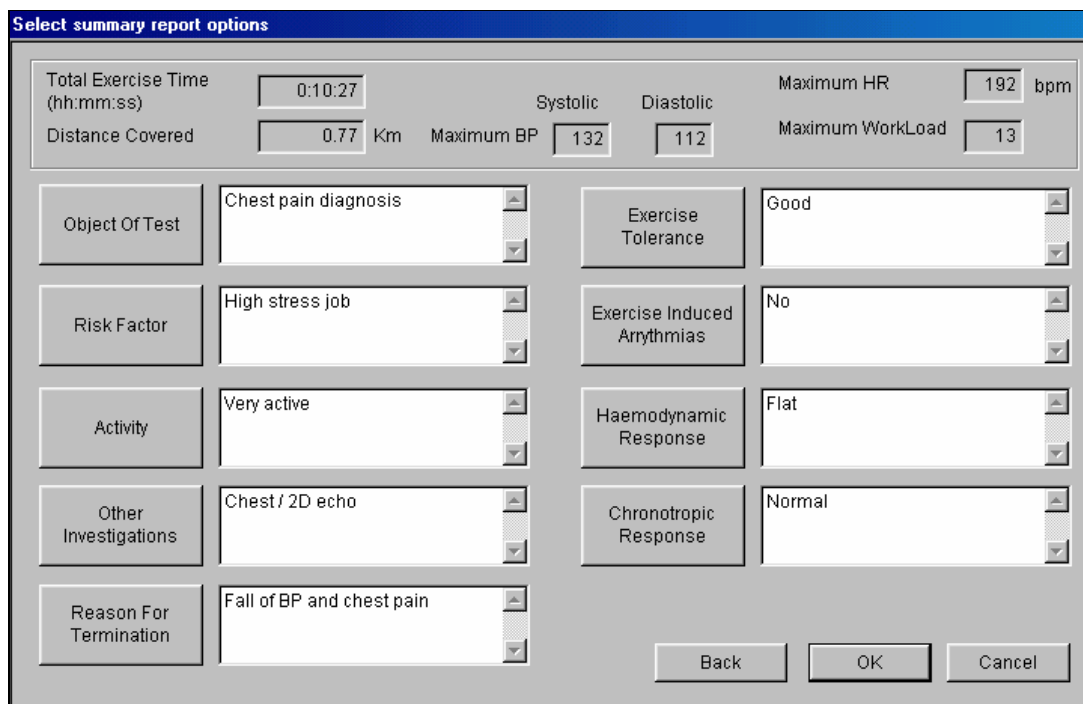
Stage Comment :

Heart rate increased

OK Cancel

Fig: 6.4: Stage comment

- Click ok to view summary report options dialog box as shown in fig. 6.4. The dialog box contents the information like
 - Total exercise time.
 - Distance covered.
 - Maximum BP: Max Systolic and diastolic values recorded during the test.
 - Maximum heart rate recorded in the test.
 - Maximum workload recorded in the test.



Select summary report options

Total Exercise Time (hh:mm:ss)	0:10:27	Systolic	Diastolic	Maximum HR	192 bpm	
Distance Covered	0.77 Km	Maximum BP	132	112	Maximum WorkLoad	13

Object Of Test	Chest pain diagnosis	Exercise Tolerance	Good
Risk Factor	High stress job	Exercise Induced Arrhythmias	No
Activity	Very active	Haemodynamic Response	Flat
Other Investigations	Chest / 2D echo	Chronotropic Response	Normal
Reason For Termination	Fall of BP and chest pain		

Back OK Cancel

Fig 6.4: Select summary report option

Along with following buttons,

- a. Object of Test.
- b. Risk factor.
- c. Activity.
- d. Other Investigation.
- e. Reason for termination.
- f. Exercise Tolerance.
- g. Exercise Induced arrhythmias.

- h. Haemodynamic response.
- i. Chronotropic response.
- j. Test conclusion.

To select the Object of Test-

To add the purpose of conducting the test, press '**Object of Test**' button. The '**Final impression selector**' as shown in fig.6.5 is displayed. Select the object of test from the list given and click on '**OK**' button. Multiple selections are allowed. Your object of test will be included in '**Select summary report option**' dialog box as shown in the figure 6.5.

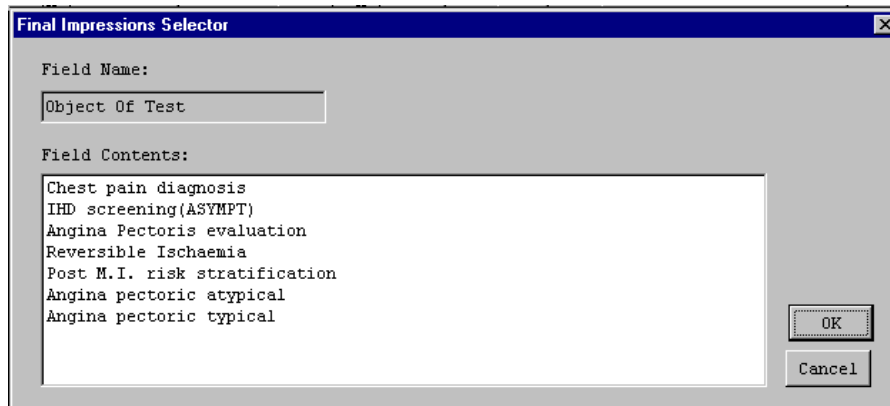


Fig 6.5: Final impression selector.

To select the Risk Factor

Similarly select the risk factor of the patient by pressing '**Risk Factor**' button. Screen as shown in fig. 6.6 is displayed. Select the appropriate option by clicking on the option and then press '**OK**' button.

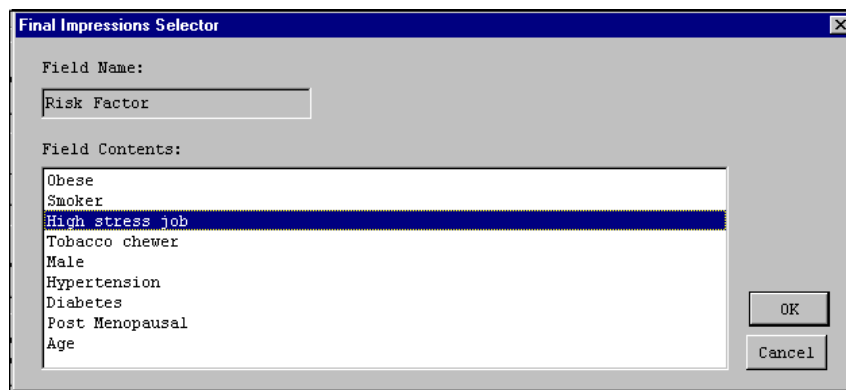
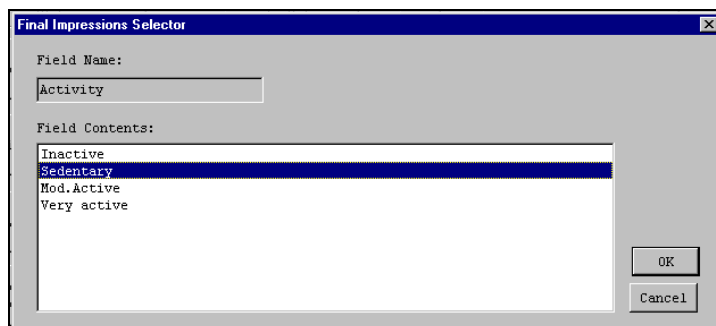


Fig. 6.6: Risk factor.

To select Activities

Press '**Activity**' button to add the patient activity in summary report. Select the required parameters and click '**OK**' button.

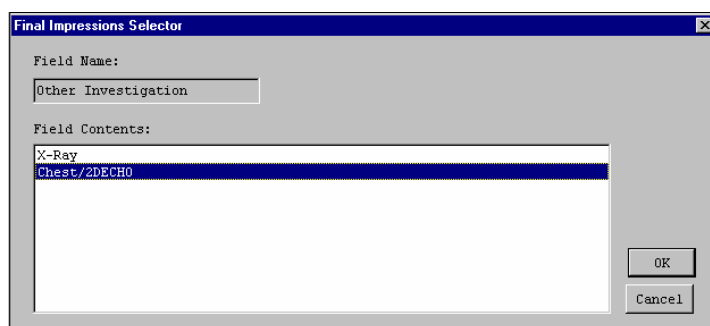


The dialog box titled 'Final Impressions Selector' has a 'Field Name:' label with a text box containing 'Activity'. Below it, the 'Field Contents:' label is followed by a list box containing four items: 'Inactive', 'Sedentary' (which is highlighted), 'Mod.Active', and 'Very active'. At the bottom right, there are 'OK' and 'Cancel' buttons.

Fig 6.7: Activity.

To select other investigation

To keep the information about the previous test conducted like X-ray etc. before stress test, press the '**Other Investigation**' button the screen as shown in fig 6.8 is displayed, select the option and click on '**OK**' button.

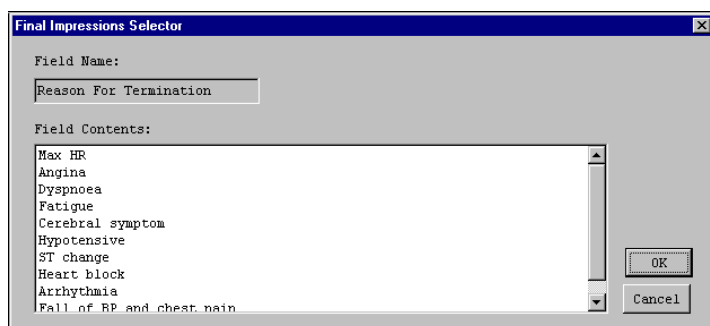


The dialog box titled 'Final Impressions Selector' has a 'Field Name:' label with a text box containing 'Other Investigation'. Below it, the 'Field Contents:' label is followed by a list box containing two items: 'X-Ray' and 'Chest/2DECHO' (which is highlighted). At the bottom right, there are 'OK' and 'Cancel' buttons.

Fig: 6.8: Other investigation.

To select the Reason for termination

Press '**Reason for termination**' button to include why you have terminated the test you can select the reason from the list as shown in fig.6.9 such as heart block, Max HR etc.

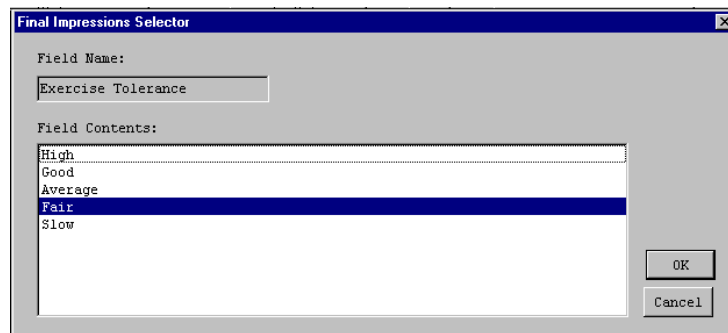


The dialog box titled 'Final Impressions Selector' has a 'Field Name:' label with a text box containing 'Reason For Termination'. Below it, the 'Field Contents:' label is followed by a list box containing ten items: 'Max HR', 'Angina', 'Dyspnoea', 'Fatigue', 'Cerebral symptom', 'Hypotensive', 'ST change', 'Heart block', 'Arrhythmia', and 'Fall of BP and chest pain'. At the bottom right, there are 'OK' and 'Cancel' buttons.

Fig: 6.9: Reason for termination of test.

To select the Exercise tolerance

You can also include the exercise tolerance factor by press '**Exercise Tolerance**' button. This is shown in the fig 6.10. Select the tolerance from the list and press '**OK**' button.

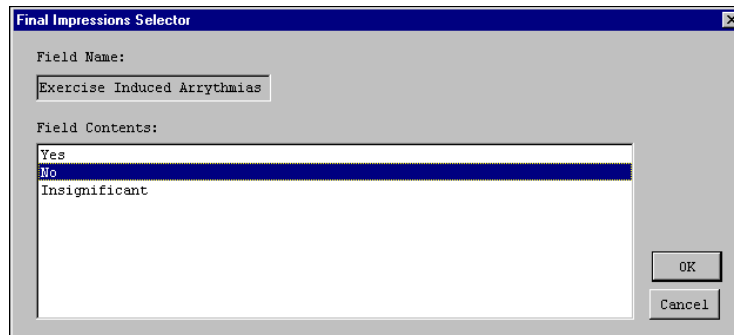


The dialog box titled 'Final Impressions Selector' has a 'Field Name:' label with a text box containing 'Exercise Tolerance'. Below it, the 'Field Contents:' label is followed by a list box containing 'High', 'Good', 'Average', 'Fair', and 'Slow'. The 'Fair' option is selected and highlighted in blue. At the bottom right, there are 'OK' and 'Cancel' buttons.

Fig 6.10: Exercise tolerance

To select Exercise induced arrhythmia.

Press the '**Exercise induced arrhythmia**' button to save the information of induced arrhythmia. You can select the option from the list given as shown in fig 6.11 to include in the summary report.

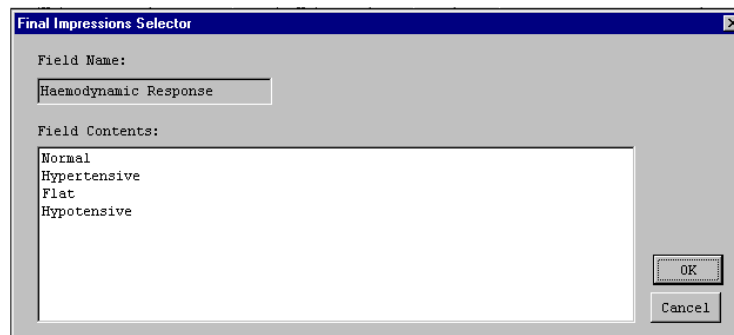


The dialog box titled 'Final Impressions Selector' has a 'Field Name:' label with a text box containing 'Exercise Induced Arrhythmias'. Below it, the 'Field Contents:' label is followed by a list box containing 'Yes', 'No', and 'Insignificant'. The 'No' option is selected and highlighted in blue. At the bottom right, there are 'OK' and 'Cancel' buttons.

Fig 6.11: Exercise induced arrhythmia

To select Haemodynamic Response

Press '**Haemodynamic response**' button to select the Haemodynamic response of the patient and to include it into the summary report as shown in fig 6.12.



The dialog box titled 'Final Impressions Selector' has a 'Field Name:' label with a text box containing 'Haemodynamic Response'. Below it, the 'Field Contents:' label is followed by a list box containing 'Normal', 'Hypertensive', 'Flat', and 'Hypotensive'. At the bottom right, there are 'OK' and 'Cancel' buttons.

Fig 6.12: Haemodynamic response

Select the response by clicking the response by the mouse. The response gets added in the summary report.

To select Chronotropic response

Press '**Chronotropic response**' button to select the Chronotropic response of the patient and to include it into the summary report as shown in fig 6.13

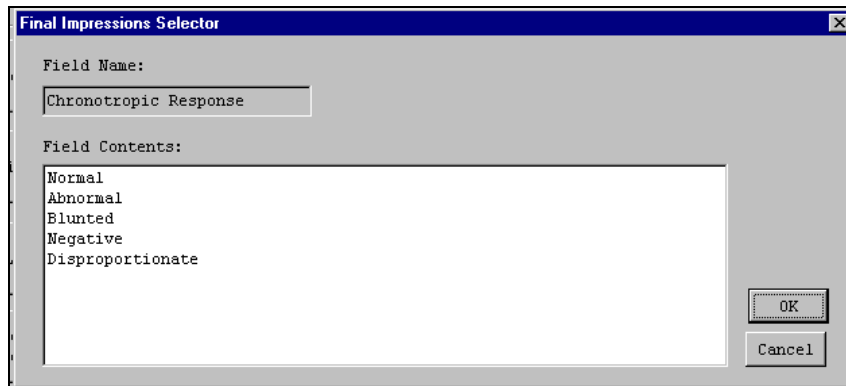


Fig 6.13: Chronotropic response.

Final Impression

Select all the details from the '**Select summary report option**'. Press '**OK**' button to save the selections.

When you press '**OK**' button, the dialog box as shown in fig.6.14 is displayed with '**Print Summary Report**', '**OK**', '**Back**' and '**Cancel**' button.

Press '**Print Summary Report**' if you want to print the summary report with all the details entered up till now. Enter the Final impression by selecting the option from the list present at the top of the dialog box and press '**Add**' button. Press '**Back**' button to go to previous stage.

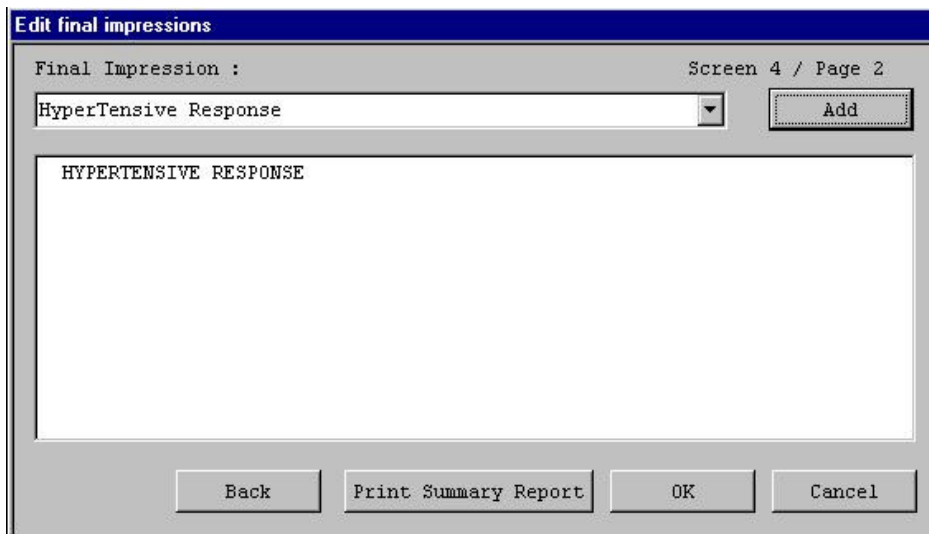


Fig 6.14: Edit Final impression.

When you press the '**OK**' button next option, ST-Level table will appear on the screen, as shown in fig. 6.14.

ST Table

This dialog box shows ST-Level of entire stages of all leads for the test, along with the '**Print**', '**Show ST-Slope Table**', '**Back**' and '**OK**' button. You can take the printout of the ST-Level table by clicking the '**Print**' button. Press '**OK**' button to move to next screen.

ST Tables												
ST Level Table:												
Stage \ Lead	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6
Pre-Test	0.4	0.6	0.1	-0.7	0.1	0.4	0.5	2.9	1.5	0.9	0.5	0.3
Supine	0.4	0.6	0.1	-0.7	0.1	0.4	0.5	2.9	1.5	0.9	0.5	0.3
Standing	0.4	0.7	0.2	-0.7	0.1	0.4	0.5	2.8	1.4	0.8	0.5	0.3
HyperVentilation	0.4	0.7	0.2	-0.7	0.1	0.4	0.5	2.8	1.4	0.8	0.5	0.3
Wait For Exercise	0.4	0.7	0.2	-0.6	0.1	0.4	0.5	2.8	1.3	0.7	0.4	0.3
Exercise Stage 1	0.4	0.6	0.1	-0.6	0.1	0.3	0.5	2.8	1.3	0.7	0.4	0.3
Exercise Stage 2	0.4	0.6	0.1	-0.6	0.1	0.3	0.5	2.8	1.3	0.7	0.4	0.3
Exercise Stage 3	0.4	0.5	0.1	-0.5	0.1	0.3	0.5	2.5	1.2	0.7	0.4	0.2
Exercise Stage 4	0.4	0.5	0.1	-0.5	0.1	0.3	0.5	2.6	1.3	0.7	0.4	0.2
Exercise Stage 5	0.4	0.5	0.1	-0.5	0.1	0.3	0.5	2.6	1.3	0.7	0.4	0.2
Exercise Stage 6	0.6	0.7	0.1	-0.6	0.3	0.4	0.4	3.2	1.6	0.9	0.5	0.3
Exercise Stage 7	0.4	0.6	0.1	-0.6	0.1	0.4	0.4	2.5	1.3	0.7	0.4	0.3
Peak Exercise	0.6	0.7	0.1	-0.6	0.2	0.4	0.4	3.2	1.5	0.9	0.5	0.3
Recovery	0.3	0.5	0.1	-0.5	0.0	0.3	0.4	2.5	1.2	0.6	0.3	0.2

Second page
Back
Print
Show STSlope
OK

Fig 6.14: ST-Level.

ST Table

This dialog box shows ST-Level of entire stages of all leads for the test, along with the '**Print**', '**Show ST-Slope Table**', '**Back**' and '**OK**' button. You can take the printout of the ST-Level table by clicking the '**Print**' button. Press '**OK**' button to move to next screen.

ST Tables												
ST Slope Table:												
Stage \ Lead	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6
Pre-Test	0.2	0.5	0.2	-4.2	-0.1	0.3	0.0	2.3	0.9	0.8	0.6	0.6
Supine	0.2	0.5	0.2	-4.1	-0.1	0.3	0.0	2.3	1.0	0.8	0.6	0.6
Standing	0.1	0.5	0.2	-4.0	-0.1	0.3	0.1	2.2	0.9	0.6	0.5	0.5
HyperVentilation	0.1	0.5	0.2	-4.0	-0.1	0.3	0.1	2.2	0.9	0.6	0.5	0.5
Wait For Exercise	0.1	0.5	0.2	-4.1	-0.1	0.3	0.1	2.3	1.1	0.6	0.6	0.5
Exercise Stage 1	0.1	0.5	0.2	-4.1	-0.1	0.3	0.1	2.4	1.2	0.7	0.6	0.5
Exercise Stage 2	0.1	0.5	0.2	-4.1	-0.1	0.3	0.1	2.4	1.2	0.7	0.6	0.5
Exercise Stage 3	0.0	0.4	0.1	-4.0	-0.1	0.1	0.1	2.3	1.2	0.5	0.5	0.3
Exercise Stage 4	0.0	0.4	0.1	-4.0	-0.1	0.1	0.1	2.3	1.2	0.6	0.5	0.3
Exercise Stage 5	0.0	0.4	0.1	-4.1	-0.1	0.1	0.1	2.3	1.2	0.6	0.5	0.3
Exercise Stage 6	0.3	0.4	-0.1	-0.9	0.1	0.1	-0.1	2.4	1.0	0.5	0.3	0.2
Exercise Stage 7	-0.2	0.4	0.0	-4.2	-0.2	0.1	0.0	2.0	1.0	0.5	0.5	0.2
Peak Exercise	0.1	0.4	-0.1	-0.9	0.1	0.1	-0.2	2.3	1.1	0.5	0.4	0.2
Recovery	-0.1	0.5	0.0	-4.0	-0.2	0.2	0.0	2.1	1.2	0.6	0.5	0.2

Fig 6.15: ST-slope table.

To view the '**Extra comment**' dialog box click on '**OK**' button of '**ST Slope**' dialog box. You can enter your additional comment as shown in fig 6.16 to have a print out, press '**Print**' button at the bottom. Press '**Back**' button to go 1 step backward. Press '**OK**' button to save the changes.

Enter extra comments
<div>ARRYTHMIA DETECTED IN THE TEST.</div>
<div>Back</div> <div>Print</div> <div>OK</div> <div>Cancel</div>

Fig 6.16: Extra comments

7. Rerun test-

If the test was unfortunately terminated by power failure or any other reason press the '**Rerun test**' button on the main menu screen or select '**Rerun test**' option from '**File**' menu. It is demonstrated in the fig 7.1

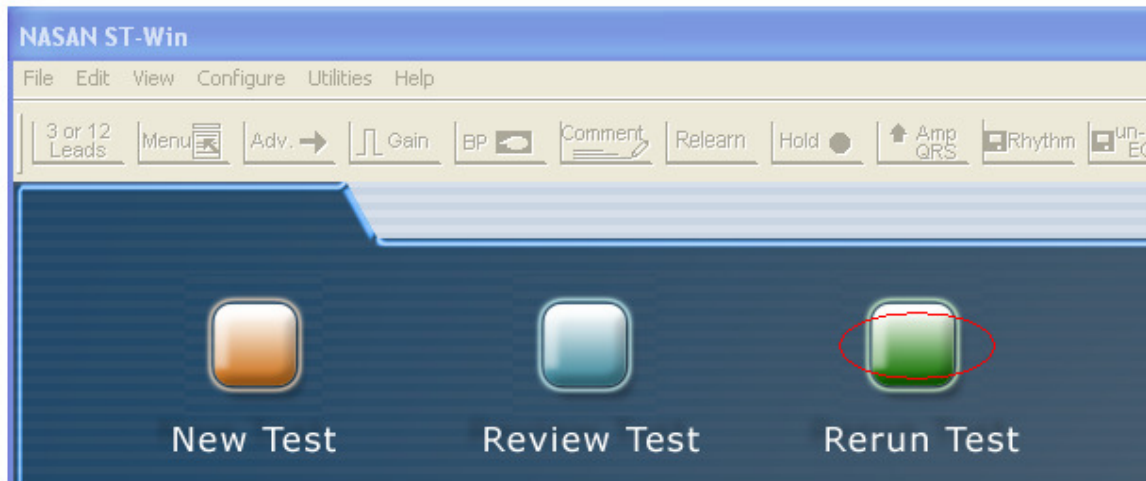


Fig. 7.1: Main screen.

Patient details dialog box with previously filled details of the patient is displayed. Press '**OK**' button to start same test again from first stage i.e. Pre test.

8. Utilities-

Go to '**Utilities**' menu to do the following connecting work,

- Test treadmill.
- Test acquisition.
- Calibration grade.
- Calibration speed.
- Store configuration of settings on floppy.
- Restore settings from floppy.
- Delete Printouts from printer queue...

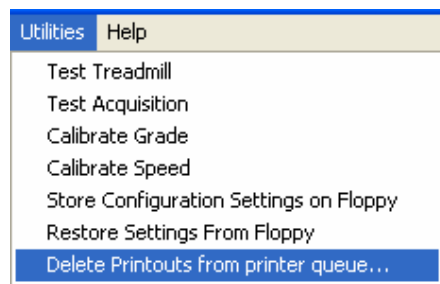


Fig 8.1: Utilities.

Test treadmill

For testing the Speed and Grade of the treadmill select the '**Test treadmill**' option from '**Utilities**' option. A dialog box is displayed as shown in fig.8.2 with speed and grade buttons. User can test the treadmill by increasing / decreasing the speed and grade buttons by pressing the arrow button seen on the dialog box.



Fig 8.2: Treadmill tester.

Test acquisition

'**Test acquisition**' is used to test the connectivity between the amplifier and PC port. When you click on '**Test acquisition**' option the message will come "**Please switch ON the amplifier.**" In case of any loose contact or other problem, error message "**The hardware unit is not working properly**" is displayed.

➤ **Calibrate grade**

For calibrating the grade of the treadmill go to the '**Utility**' menu and press '**Calibrate grade**' option. A dialog box will appear on the screen as shown in the fig 8.3.



Fig 8.3

1. When the treadmill reaches to its maximum elevation press '**OK**' button. When 'OK' button is pressed treadmill starts moving down and following message as shown in fig 8.4 is displayed.



Fig 8.4

2. After the treadmill reaches its minimum elevation press '**OK**' button. When 'OK' is pressed calibration constants for grade are calibrated and stored. These calibration constants are displayed in ST-Win configuration dialog box.
3. If an error is detected this message appear on the screen,



Fig 8.5

➤ **Calibrate speed**

For calibrating the speed of the treadmill go to '**Utility**' menu and select '**Calibrate speed**' option. This will display the dialog box as shown in the figure 8.6 below. Count the number of seconds for 14 rotations and enter the number in the edit box. Do this for one more time and enter the count in the second edit box. Press '**OK**' button to move to next stage of the protocol.

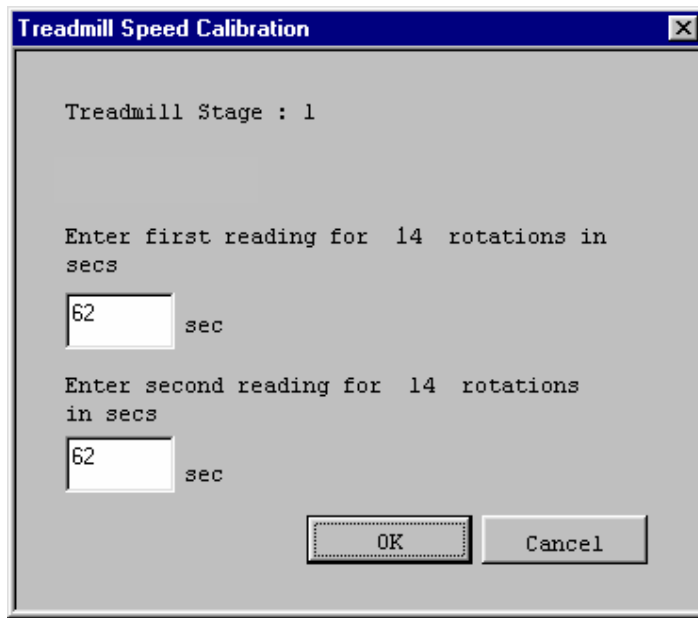


Fig. 8.6: Treadmill speed calibration.

Above explained process will be carried out up to 7 stages of BRUCE protocol. At the end of 7th stage, speed calibration constants are calculated and saved. These constants are displayed in ST-Win configuration dialog box.

➤ **Store configuration settings on floppy.**

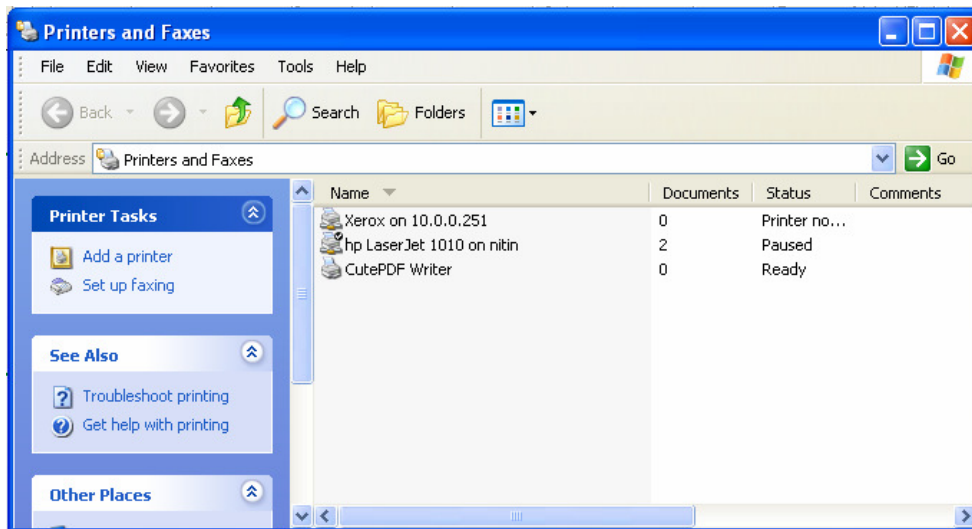
Settings done using configure menu option or through '**Configure system**' button on Installation dialog box can be stored on a floppy. For this purpose go to '**Utility**' menu and select the option '**Store configuration of setting on floppy**'. All the setting will be copied to floppy.

➤ **Restore settings from the floppy.**

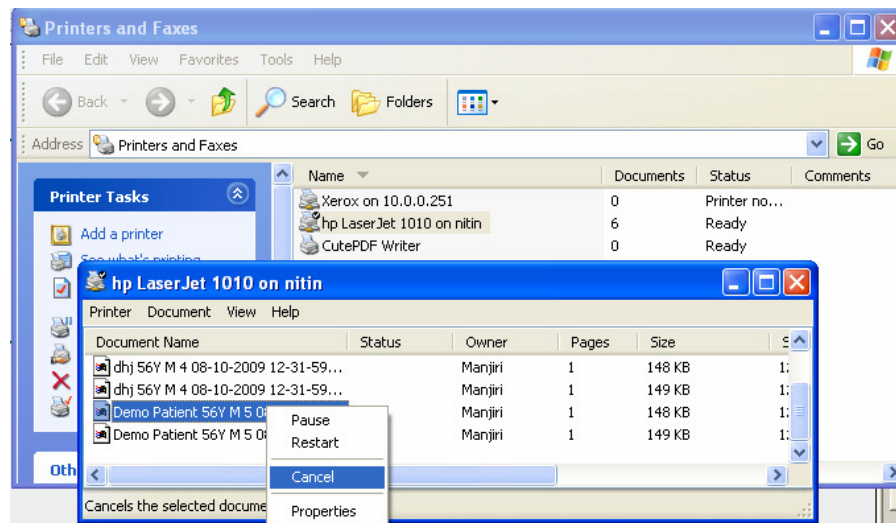
Choose this option from '**Utility**' menu to install the setting saved on the floppy. When pressed this button, setting stored in the floppy are restored in the newly installed software.

➤ **Delete printouts from printer queue ...**

To delete printouts from printer queue go to Utility and select '**Delete printouts from printer queue.**' option. Following '**Printer and Fax**' dialog box will be displayed.



Select the printer which is connected to ST win unit and double click on it. Following dialog box will be displayed.



It will display that documents stucked in the queue and if those documents in the queue are not required then right click on it and select 'cancel' option as shown in above figure. It will delete the documents in queue.

9. Enhanced features-

Sending reports through mail-

To send the reports through mail to the consultant, go to '**File**' menu and select the '**Send report**' option. The dialog box as show in the figure 9.1 will be displayed on the screen.

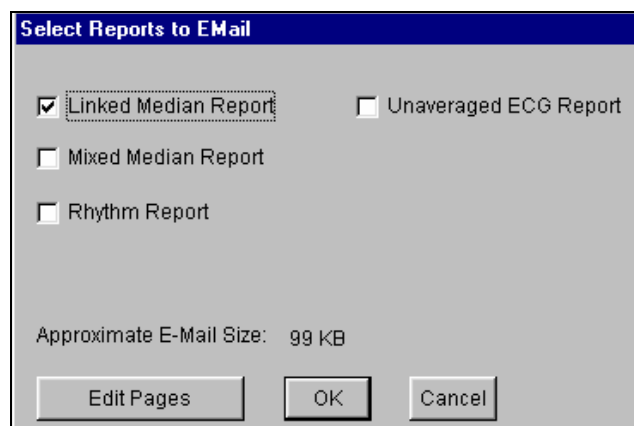


Fig.9.1: Select report to E-mail.

Select the reports to be attached with the mail by clicking the respective report from the dialog box. The approximate size of the mail will be displayed at the bottom of the dialog box. The user can delete the number of marked pages by clicking '**Edit Pages**' button. The dialog box shown in the fig 6.2 will appear on the screen. User can view and delete the marked pages if required. Press the '**OK**' button to go to send mail dialog box as shown in the figure 9.2.

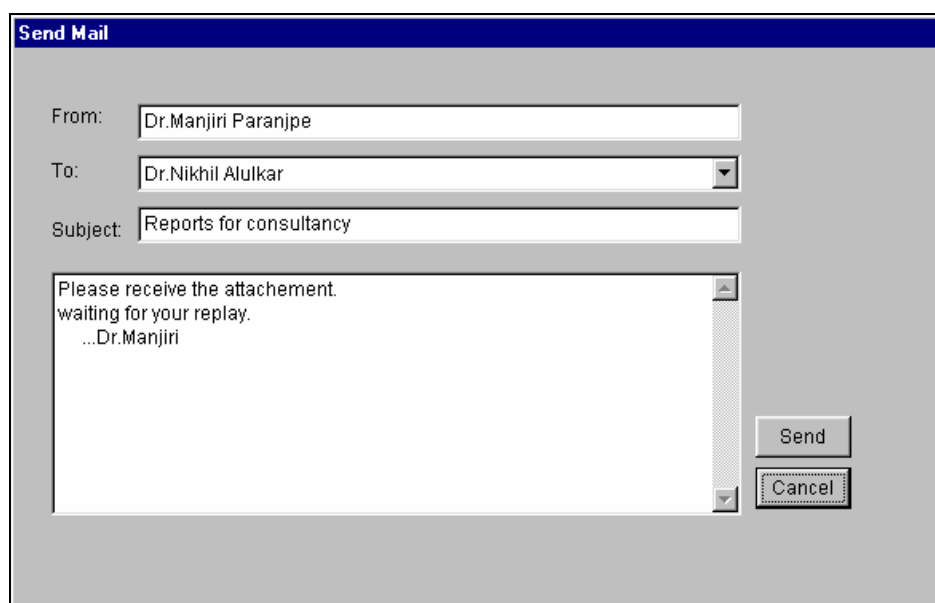


Fig.9.2: Send mail dialog box.

The user name automatically comes as '**From**' name. The user can select the consultant from the '**To**' drop down. Enter the Subject in the subject text box and the queries in the text box provided. After entering the queries press '**Send**' button. This will take some time for attaching the marked pages to the mail. Messages of attaching the mail will be displayed at the bottom of the dialog box. A message box of "**Mail Sent**" will appear if the mail is sent successfully. In case of any error appropriate message will be displayed.

10. Trouble shooting-

- ❑ **Traces are not coming?**

Restart the system. Check all the connections. Contact the system engineer.

- ❑ **Traces coming as straight lines?**

Check if the patient cable connection is proper or not. Check if the amplifier is ON or not.

- ❑ **Medians are coming as straight lines?**

This will happen if the QRS detection leads (The third lead in the display) does not have tall and upright R waves. Use parameter '**QRS Amp**' button in the Menu option of the toolbar at acquisition time.

- ❑ **Heart rate not coming?**

If 40 sec have passed and heart rate is not coming, check if medians are coming as straight lines. If so follow help as mentioned in "Medians are not coming as straight lines'.

- ❑ **Printouts not coming or printing junk?**

Check the configure ST-Win for printer type selected i.e. laser or desk jet.

11. Appendix A

Earthing:

The Earthing for the system should be proper. This is to ensure patient safety and for no interference of line voltage fluctuations. For correct earthing procedure, refer to work order booklet and get it done and approved from licensed electrician only.

If the earthing is not proper, leakage currents may pass from the amplifier to ground through the patient. If the current magnitude is large, it can be harmful for the patient.

Following are the indications for stress testing.

1. Evaluating the patient with chest pain or with other findings suggestive but not diagnostic of coronary disease.
2. Determining prognosis and severity of the disease.
3. Evaluating the effects of medical and surgical therapy.
4. Screening for latent coronary disease.
5. Evaluation of congestive heart failure.
6. Evaluation of arrhythmias.
7. Evaluation of functional capacity and formulation of exercise prescriptions.
8. Evaluation of congenital heart disease.

Absolute contra-indications for stress test –

1. Patients with an acute myocardial infraction.
2. Patient suffering from acute myocarditis or pericarditis.
3. Patient exhibiting signs of unstable progressive angina.
4. Patient with rapid ventricular or arterial arrhythmias.
5. Patient with second or third degree heart block and patients with know severe left main disease.
6. Acutely ill patients, such as those with infections.
7. Patient with locomotion problems.

Relative contra-indications for stress test-

1. Aortic stenosis.
2. Suspected left main equivalent.
3. Sever ST depression at rest.
4. Sever hypertension.
5. Congestive heart failure.

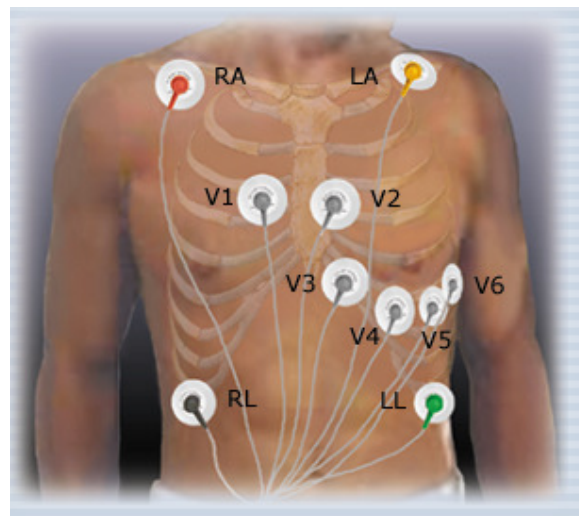
12. Appendix B

a. Patient preparation -

Proper patient preparation is the most important factor in obtaining proper results from a ST-Win system. If electrodes are applied to improperly prepared skin site then this may result in excessive base line shift and severe artifact while obtaining an ECG.

The skin at 6 chest leads and 4 limbs leads sites has to be prepared.

b. Electrode placement-

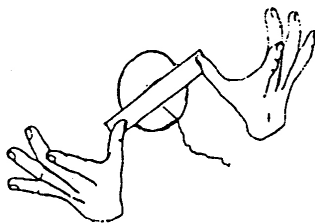


Electrode Placement

Place electrode one by one on selected sites. Press the electrodes from inside to outside covering entire electrode area.



Take care that gelled pad is in firm contact with the skin surface.
Place patient lead on all electrodes as shown in Figure.



Apply Medical adhesive tape
(dressing tape / bandage tape) across the electrode.

- Apply some jelly to the electrode site and thoroughly rub the site with gauze till it becomes slightly red. This removes the horny non-conducting layer of the epidermis enabling a good electric contact with the body fluids.
- Remove all the traces of jelly by wiping the abraded site with warm dry cloth and completely dry up the site with dry towel. The skin must be clean, dry and completely free of jelly for the electrodes to remain well in position till the end of ECG acquisition.
- Take an electrode and peel it off from its plastic backing. Finger contact with the adhesive should be minimized and jelly in the foam pad should not be disturbed. If the jelly has dried out then discard the electrode.
- Apply the electrode to the prepared site and run your fingers around the foam pad smoothing it from the center out. Repeat this procedure for all sites

NOTE-

We recommend the use of good quality disposable electrode (With one time usage only).

No assurance of quality result can be given if reusable electrodes are used.

C. General precautions for using the treadmill-

- Read this section before operating the treadmill.
- Keep the area underneath the treadmill clear.
- Do not start the treadmill when someone is standing on the belt.
- Do not leave a patient unattended on the treadmill.
- Do not stop the treadmill if someone is walking on it except in case of emergency.
- Keep speed and grade at minimum when patients are getting on the treadmill.

13. Appendix C-

ST-Win acquisition unit specifications-

❖ ECG Amplifier

- Input dynamic range: +/-5mVAC+/-500mVAC
- Gain: 1000
- CMRR: >120dB
- Frequency response: 0.05Hz to 100 Hz
- Patient Isolation: Through optocoupler

❖ Acquisition card

- Resolution: 12 Bit
- Sampling rate: 250 samples per second simultaneous
- 256 pole DSP filter for removal of noise and base line wander
- Acquisition and filtering using DSP

❖ Electrical:

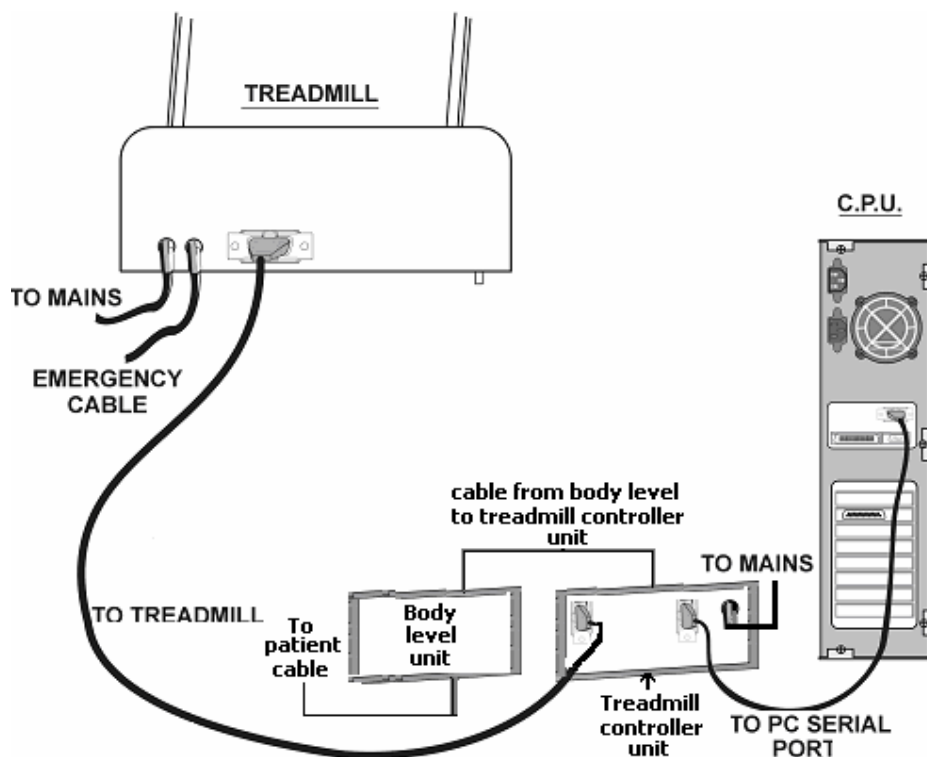
- Operates on 230 VAC+/- 10% @ 50Hz mains

❖ Environmental:

- Operating temperature range: -5 to 50°C
- Humidity: 0 to 95% Non condensing

Interconnection diagram-

ST WIN with Body level unit



WARNING:

DO NOT CONNECT OR REMOVE ANY CABLE WHEN INSTRUMENT IS POWERED ON.

Note: Always connect Body level amplifier while taking new test and Calibration of treadmill.

14. Appendix D-

Defragmentation of the hard disk is a recommended job to do at least once in 3/4 months. This is because as the number of test conducted get increased doctors stats deleting the tests.

The tests are stored randomly on the hard disk. This creates delay to open any of the applications. By Defragmentation of the hard disk all the files are arranged in sequence. Thus helps in making PC faster.

Following steps can do this,

- Click 'Start' button
- Go to 'Program' then 'Accessories'
- Go to 'System Tool'
- Select 'Disk Defragmentation'

After selecting the Defragmentation option it ask for the drive to select. Select the drive as per your requirement and click the 'OK' button of that screen. As soon as the button is click Defragmentation starts and the dialog box as seen below in fig 11.1 will appear on the screen.

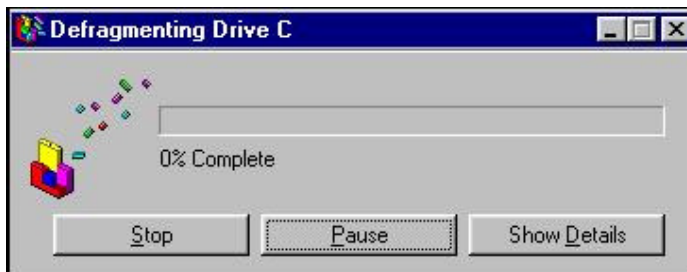


Fig: 13.1 Defragmentation

This will take several hours to complete as per the data stored in the Hard disk.

NOTE: - Please do not carry on any application will Defragmentation is on.



Nasan Medical Electronics Pvt. Ltd.
1st floor Rangali Society, Opp. Karve statue, Kothrud-Pune-411038
Phone: 020-25391290, www.nasanmedical.com

**Installation commissioning report- cum warranty
Certificate**

Product Name –

Date: _____

Customer Name:		Equipment Location:	
Name of Hospital/Clinic/ Diagnostic Center:		Serial no. of machine:	
Address:		Invoice(Bill) No.	
Phone No.:		Dealer Name:	
Mobile no.:			
Name of the person / persons trained to use and operate the product/s:			
The above-referred unit has been supplied in good condition and installed successfully. The same is functioning satisfactorily. The required training on the use of the said unit has been given to us.			
The warranty valid till 12 months from the date of installation or 13 months from date of invoice, whichever is earlier.			
Note: 1) Training is given only once. Additional training will cost extra. 2) All disputes are subject to Pune jurisdiction only. All other jurisdiction expressly barred.			
Name and signature of NASAN's Sales/Service/Dealer Representative		Name and signature of customer (Please affix stamp / seal)	

Customer Copy



Nasan Medical Electronics Pvt. Ltd.
1st floor Rangali Society, Opp. Karve statue, Kothrud-Pune-411038
Phone: 020-25391290, www.nasanmedical.com

**Installation commissioning report- cum warranty
Certificate**

Product Name –

Date: _____

Customer Name:		Equipment Location:	
Name of Hospital/Clinic/ Diagnostic Center:		Model No. (Serial no. of machine):	
Address:		Invoice No.	
Phone No.:		Dealer Name:	
Mobile no.:			
Name of the person / persons trained to use and operate the product/s:			
The above-referred unit has been supplied in good condition and installed successfully. The same is functioning satisfactorily. The required training on the use of the said unit has been given to us.			
The warranty valid till 12 months from the date of installation or 13 months from date of invoice, whichever is earlier.			
Note: 3) Training is given only once. Additional training will cost extra. 4) All disputes are subject to Pune jurisdiction only. All other jurisdiction expressly barred.			
Name and signature of NASAN's Sales/Service/Dealer Representative		Name and signature of customer (Please affix stamp / seal)	

NASAN Copy