



**Standard BL**

Version 6.5

# User Manual

Nasan Medical Electronics Pvt. Ltd.

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*Hope you don't require service at all.*

*But incase you require,*

*Please contact: 09371039255/09371809026*

*For any working days 9.30a.m to 6 p.m*

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.

We are once again giving our contact details\_

**Nasan Medical Electronics Pvt. Ltd.**

1<sup>st</sup> floor Rangali Society

Opp. Karve statue

Kothrud

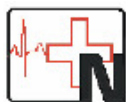
Pune-411038

Website: [www.nasanmedical.com](http://www.nasanmedical.com)

Phone: 020-25391290,

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**NASAN**

Understanding the billion- hearts of India

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**User manual for**  
**ST-Win Standard BL**

**The complete Window's based Stress Test machine.**

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## **1. Introduction-**

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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 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

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### 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) : working serial ports 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

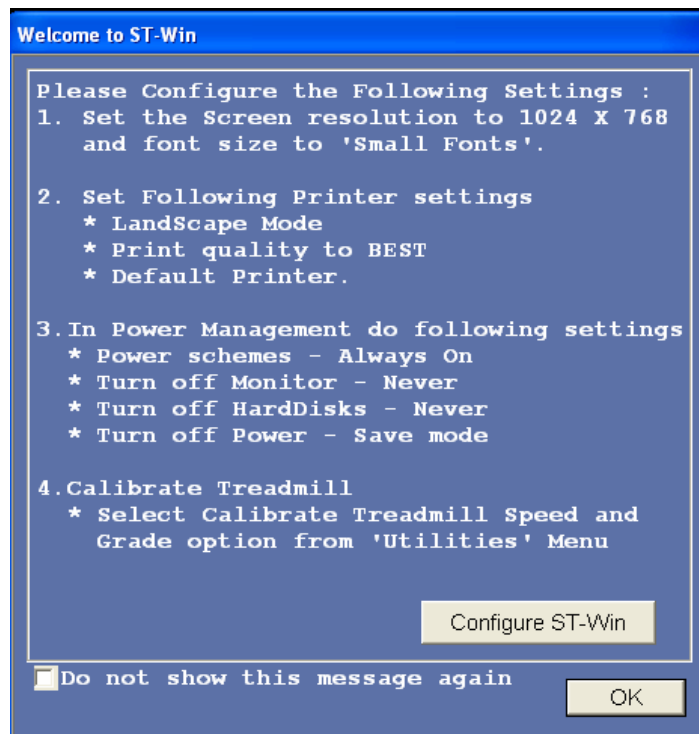
### **WARNING:**

#### **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-

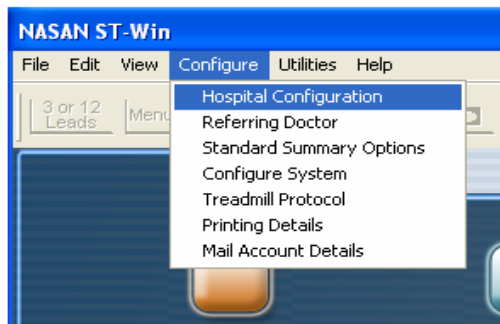
1. Go to Windows "**Start**" menu.
2. Select "**Control Panel**" option.
3. Double click on "**Printer and Faxes**" option.
4. Right click on the printer icon and select '**Properties**' option.
5. Set following properties for the printer
  - Landscape Mode
  - Print quality to '**BEST**'
  - Page size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





**Figure 3.2: Configure Menu.**

### 1. Hospital configuration-

This option from the '**Configure**' menu provides facility of storing the list of doctors and the consultant doctors attached to your hospital. 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. 3.3A.
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.

 The image shows a screenshot of the 'Hospital Information' dialog box. It contains the following elements:
 

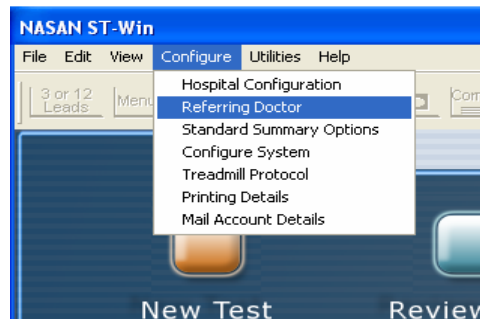
- Hospital Name :** A text input field with the value 'rr'.
- Hospital Address:** A text input field with the value 'rr'.
- Doctor's Name :** A text input field.
- Doctor's Designation :** A text input field.
- Table:** A table with 3 columns: 'Sr.No', 'Name', and 'Designation'. It contains two rows of data.
 

Sr.No	Name	Designation
1	rr	rr
2	Dr. Amit	M.D.
- Buttons:** 'Add', 'Modify', 'Delete', 'OK', and 'Cancel'.
- Footer:** A note that says 'Double click on the record you wish to modify.'

**Figure 3.3A: 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.

Configure Referrer Doctor Info

Reference Doctor's Name:

Reference Doctor's Designation:

Sr.No	Name	Designation
1	shirin Taralkar	M.D.

Add Modify Delete OK Cancel

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.

Edit standard summary options

Field Name:

Field Contents:

Object Of Test

Object Of Test  
Risk Factor  
Activity  
Other Investigation  
Reason For Termination  
Exercise Tolerance  
Exercise Induced Arrhythmias  
Haemodynamic Response  
Chronotropic Response  
Test Conclusion

Chest pain diagnosis  
IHD Screening (Asympt)  
Angina pectoris evaluation  
Functional capacity evaluation  
Routine check up  
Reversible ischaemia  
Post M.I. risk stratification  
Angina pectoric atypical  
Angina pectoric typical

Add  
Modify  
Delete  
OK  
Cancel

\* Click the item in Field Contents List to "Delete".  
\* Double-click the item in Field Contents List to "Modify".

**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

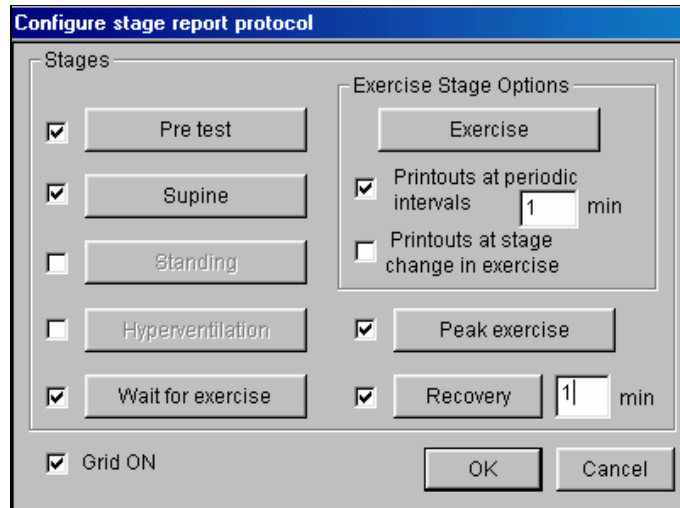
**Fig.3.5: ST-Win configuration dialog box.**

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

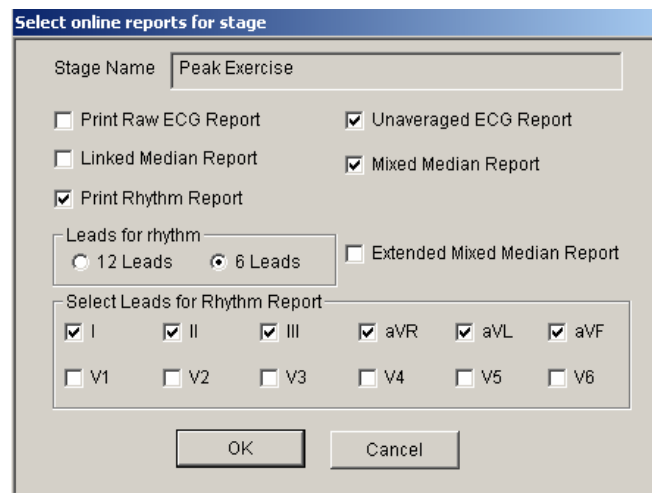
1. Select the speed unit for treadmill to '**Kilometers per hours**' or '**Miles per hours**' as per the requirement of Treadmill.

2. Configure treadmill speed at exercise stop to '**1.2 kmph**' or '**Slow-0 kmph**' or '**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.
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 **Compact, Treadstar, Trackmaster and Treadstar XP.**
8. Select the '**COM port**' as COM 1 , COM 2, COM 3, COM 4, COM 5, COM 6 to which Stress test amplifier is connected.
9. **Median update time in seconds** this option is provide for setting the time to update the median. Select the required time to update the medians from the dropdown box.
10. 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.
11. Check the '**Automatic printouts**' option to print the report as per '**Stage report protocols**' while conducting the test.
12. To print linked median report automatically at peak exercise stage check '**Automatic printout of peak exercise linked median report**' takes the printout when peak exercise stage is over. Check the checkbox for automatic printouts of peak exercise linked median report.
13. 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.
14. Check the '**Set Trace-I lead same as AUTO Enlarge Median**' option to display Trace1 lead automatically same as enlarged median lead.
15. 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.
16. Check the "**Change Paper Orientation to Landscape**" option to print report in Landscape Orientation.
17. To set the protocol for online printouts click the '**Stage report protocol**' button.
  - A dialogue box as shown in above fig.3.6 is displayed on the screen.

- Check the stages that you want to include in your protocol for printing. A dialog box shown in the fig. 3.7 below is displayed.
- To configure printouts at defined interval in Exercise and Recovery stage, enter interval in text box. Click the check box of '**Grid ON**' to have the grid on the printouts.



**Fig.3.6: Stage report protocol creator.**



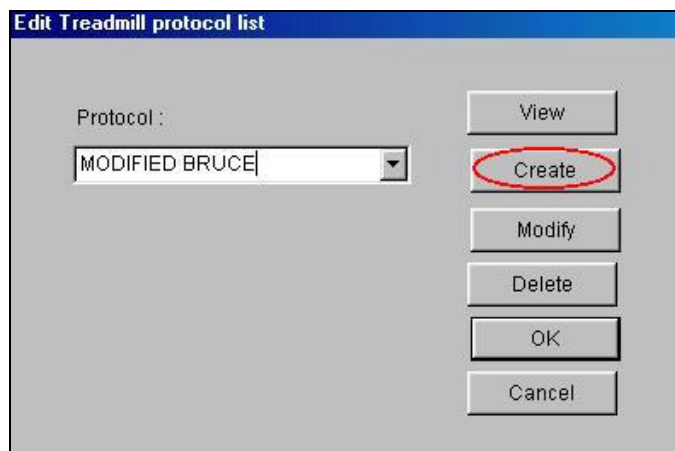
**Fig 3.7 Select online report stages**

- Press the '**OK**' button to '**save and exit**' the protocol settings.
- Press the '**Cancel**' button to exit without saving.

15. Advance button is having the constant generated by calibrating the treadmill. Only Nasan service engineer can execute it.
16. Click "**OK**" button of the ST-Win configuration program to save the settings you have made.

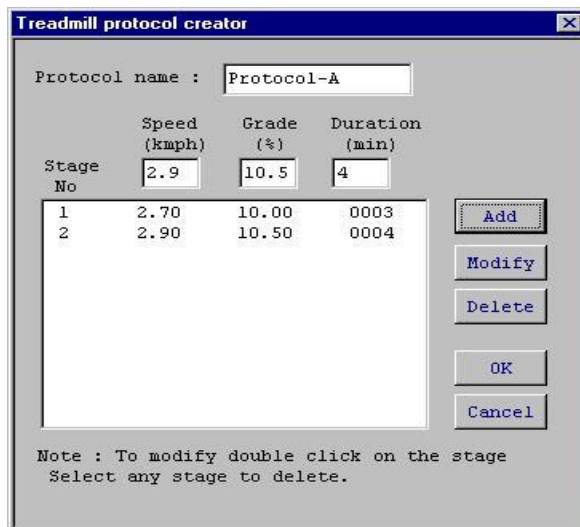
## **5. Treadmill protocol -**

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.



**Fig. 3.9: Treadmill protocol 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. After editing the stage, press '**Modify**' button.

6. Press '**OK**' to save the change and exit.
7. Press '**Cancel**' to exit without saving.
8. To modify the user defined protocol; select the protocol name from the list and click '**Modify**' button. A dialogue box shown in fig.3.9 is displayed filled with contents of existing protocol. Make the require changes and press '**Modify**' button. Press '**OK**' button after doing required modifications.
9. 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.
10. Press '**OK**' to save the change and exit.
11. 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.

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

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



**Select page configuration for printing**

Trend Report Title

Linked Median Report Title

Stage Report Title

Rhythm Report Title

Raw ECG Report Title

Superimpose Report Title

Mixed Median Report Title

Unaveraged ECG Report Title

Brief Summary Report Title

Select hospital position  
☐ Left  
☒ Center  
☐ Right

Select Fonts  
☒ Report Title  
☐ Hospital Name  
☐ Patient Details  
☐ Summary Report

Grid Style  
☐ No Grid  
☒ Grid  
☐ Graph

☐ Colour Printing  
☐ Print Administrative Details with gray background  
☐ Print Border  
☐ Print Admin Border

**Figure 3.10: Print page details.**

**Select Font**

Font  
☒ Arial  
☐ Times New Roman  
☐ Courier New  
☐ Bookman Old Style

Font Style  
☐ Regular  
☒ Bold  
☐ Italic  
☐ Bold Italic

Colour  
☒ Black  
☐ Blue  
☐ Red  
☐ Magenta

Size  
☐ 10  
☒ 12  
☐ 16  
☐ 20

☒ Underline

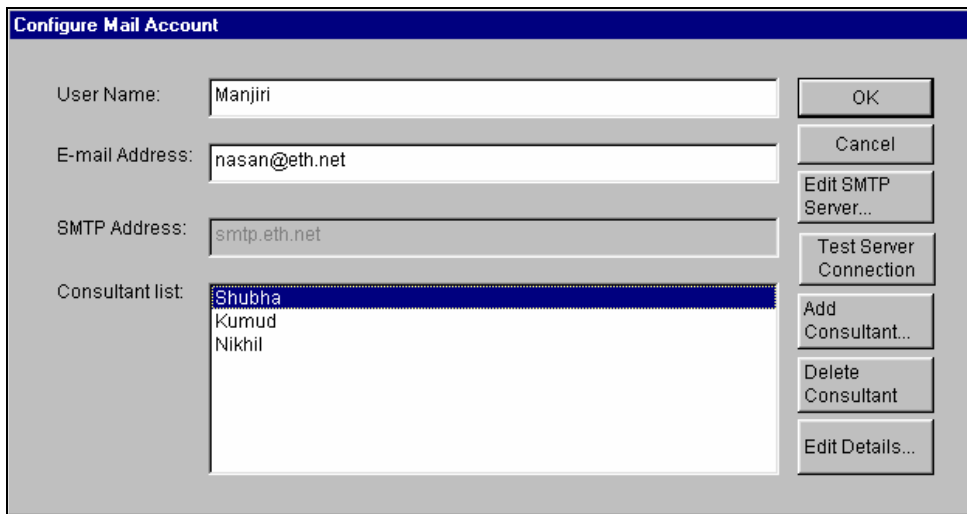
**Fig.3.11: Select font.**

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 the '**Mail account details**' of '**Configure**' menu option. The screen displayed in the figure 3.12 will appear on the screen.



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

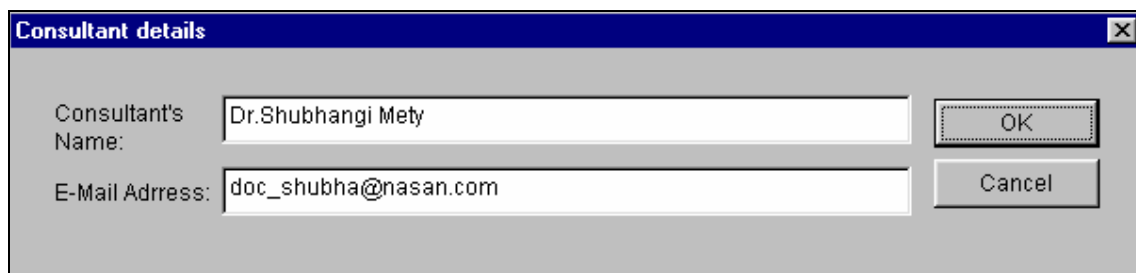
**Fig: 3.12: Configure mail account.**

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 3.13 will appear on the screen.



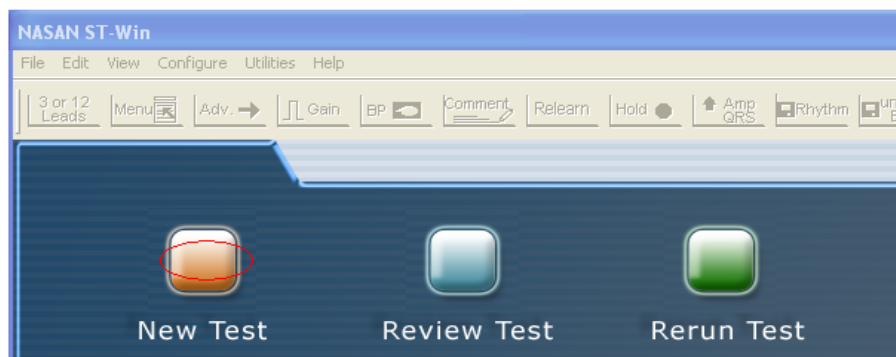
The 'Consultant details' dialog box has a title bar with the text 'Consultant details'. It contains two text input fields: 'Consultant's Name:' with the value 'Dr.Shubhangi Mety' and 'E-Mail Address:' with the value 'doc\_shubha@nasan.com'. On the right side, there are two buttons: 'OK' and 'Cancel'.

**Fig.3.13: 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.

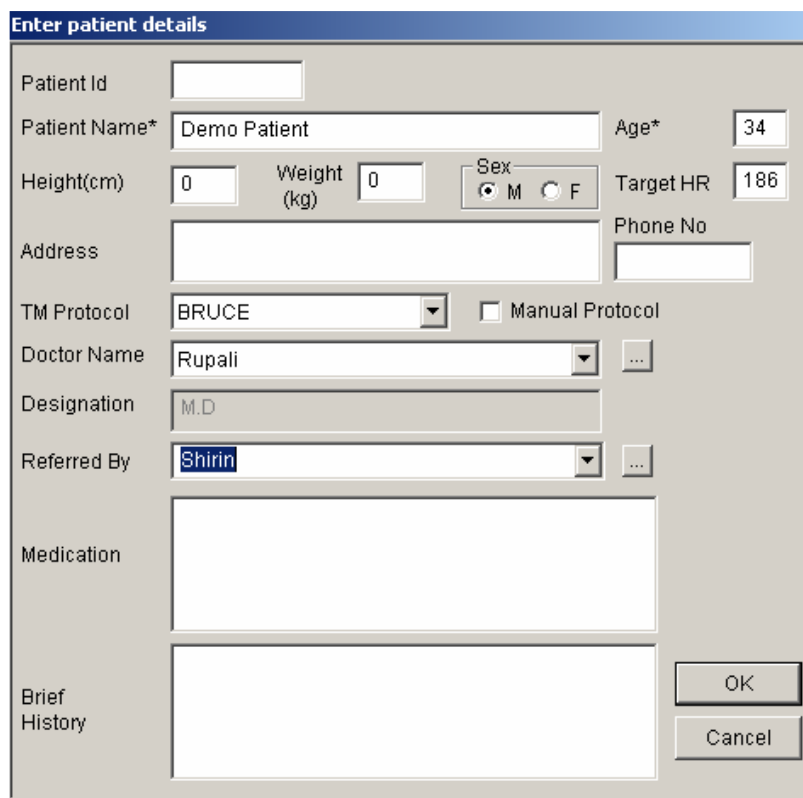
## 4. Conducting a test-

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.



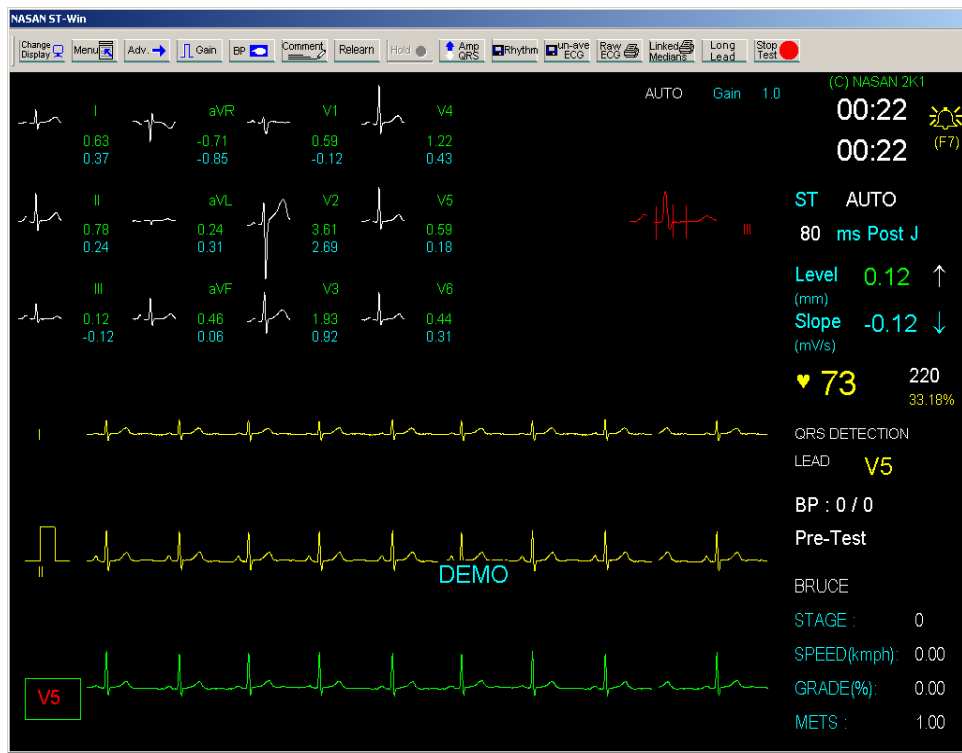
**Fig. 4.1 Main screen:**

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.
2. 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. **Change Display.**
2. **Menu.**
3. **Adv (Advanced stage).**
4. **Gain.**
5. **BP.**
6. **Comments.**
7. **Relearn.**
8. **Hold**
9. **Rhythm**

10. Un-avg ECG (Un-averaged ECG).
11. Amp QRS (Amplify QRS)
12. Raw ECG
13. Linked Medians
14. Long lead
15. Stop Test



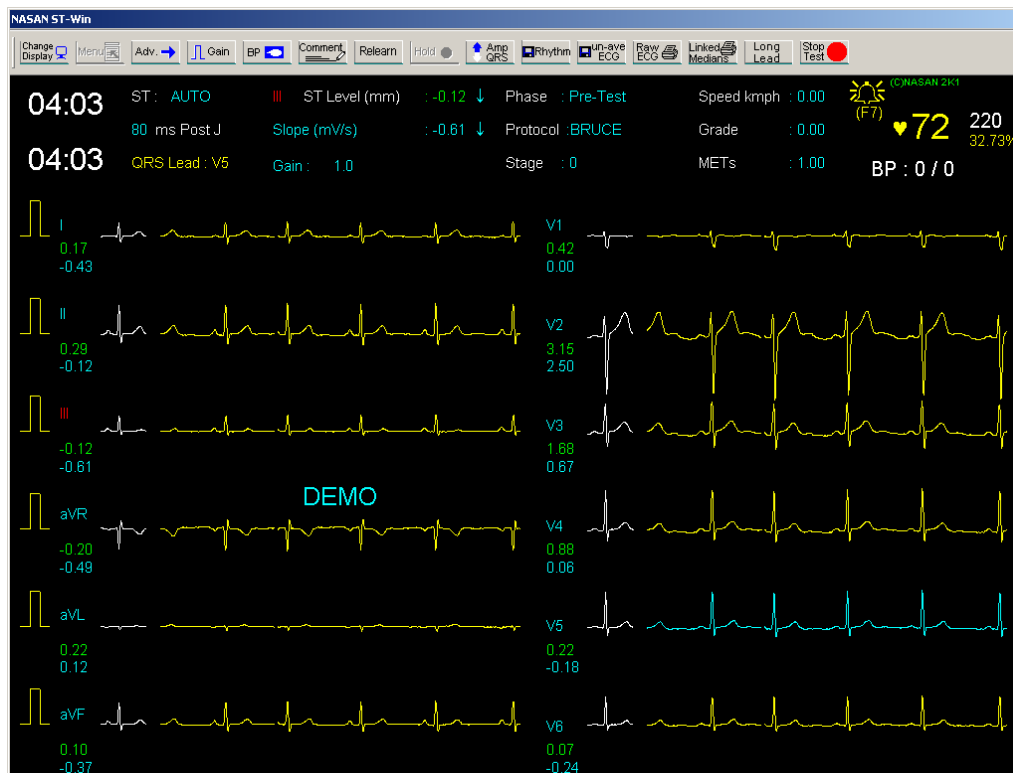
**Fig.4.4: Tool bar.**

## 1. Change Display



Use this menu to toggle between 3 and 12 lead display mode. Press '**Change Display**' to view the 12 leads ECG with median as shown in fig 4.5.

Click 'Change Display' button to go back to 3 lead display mode.

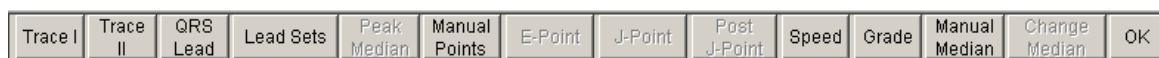


**Fig 4.5: 12 lead acquisition.**

## 2. Menu

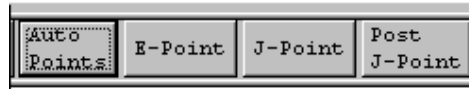


Press '**Menu**' button to change the following options given in control bar shown in fig 4.6



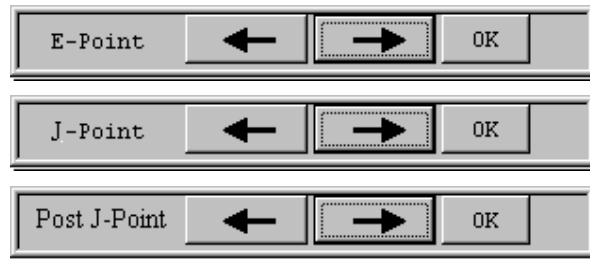
**Fig 4.6: Menu bar.**

- To change the 1<sup>st</sup> ECG trace lead, press '**Trace I**' button on the menu bar.
- To change the 2<sup>nd</sup> 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.
- 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 4.7



**Fig 4.7**

- Press '**E-point**' button to change the position of E-point to left or right press the '<-' or '->' button as shown in fig 4.8 respectively. Similarly press J-point and Post J-point button to change the position of J-point and post J-point respectively.



**Fig 4.8**

- Press manual auto button to toggle the auto or manual selection of enlarged 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 4.9. 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 4.9**

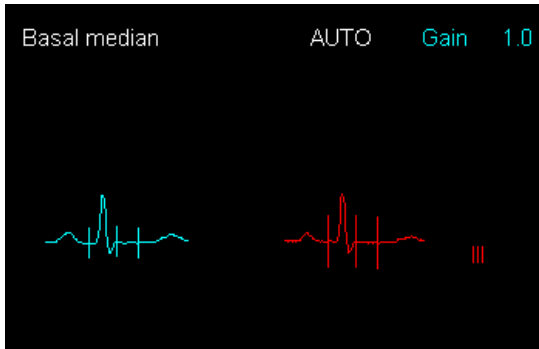
- Press '**OK**' button to go back to main tool bar by saving the changes done in the positions of the points.
- In all stage user can increase or decrease the '**Speed**' and '**Grade**' of the treadmill. Press 'Speed' or 'Grade' button to change the speed and grade of the treadmill. Speed and Grade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



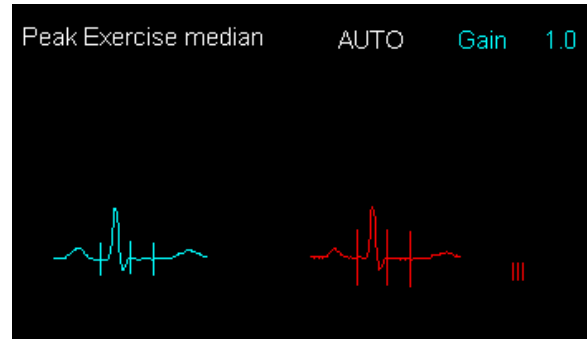
**Fig 4.10**

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.

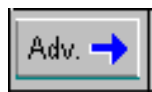


Click this to switch ON filter

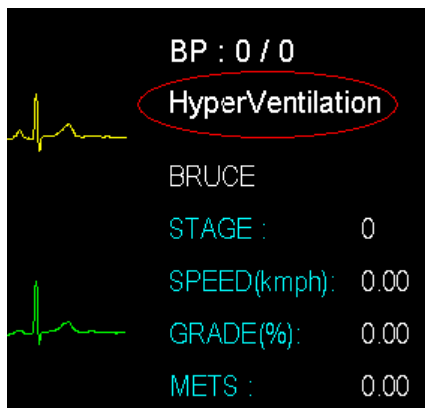


Click this to switch OFF filter

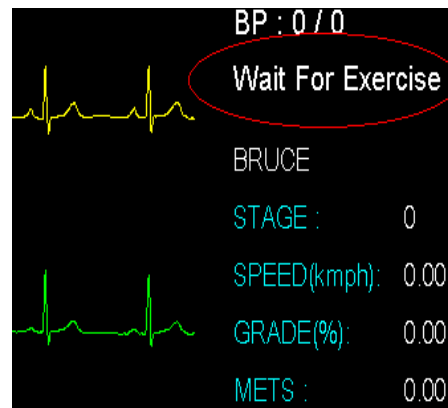
### **3. Adv (Advanced stage)**



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.



**Fig.4.13: Before Advance stage.**



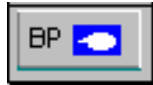
**Fig.4.14: After Advance stage.**

#### 4. 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.

#### 5. 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

#### 6. 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.

Stage Comment :	Arrhythmia detected	OK	Cancel
-----------------	---------------------	----	--------

Fig 4.16: Comment dialog box.

#### 7. Relearn



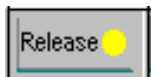
If there is noise on ECG traces because of loose electrode or some other reason, median calculations go wrong. Press electrode, wait till traces get stabled and then press '**Relearn**' button to recalculate the medians and heart rate.

#### 8. 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.

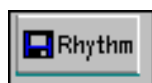
#### 9. Release



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.

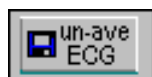


## 10. Rhythm



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. 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).

## 13. Raw ECG



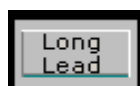
Press '**Raw ECG**' button to take printout of the raw ECG at that particular instance.

## 14. Linked Median

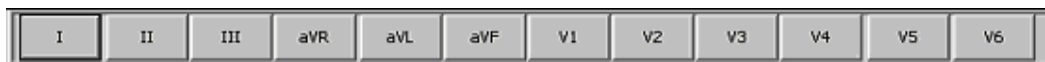


Press '**Linked Median**' button to take linked median printouts of that particular instance.

## 15. Long lead



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



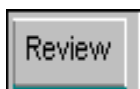
Select desired long lead. Selected lead will be printed in linked median report at the time of acquisition.

## 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. You can also stop the test by pressing F5 key from the keyboard.

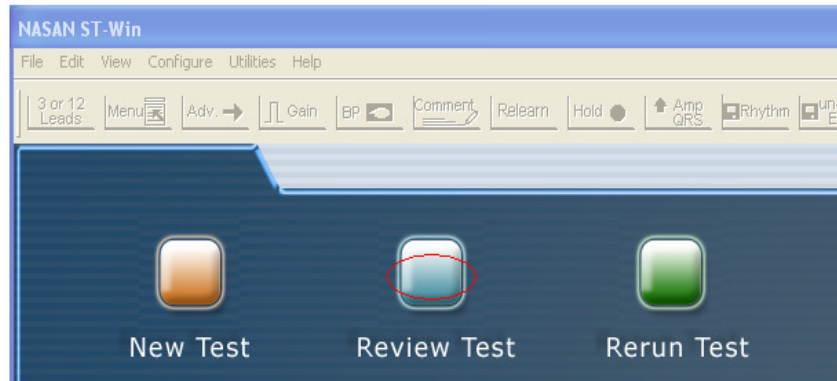
## 17. Review



When the test reaches the recovery stage '**Review**' button is displayed on the toolbar in place of '**STOP TM**' 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 (Figure 5.1).



**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.

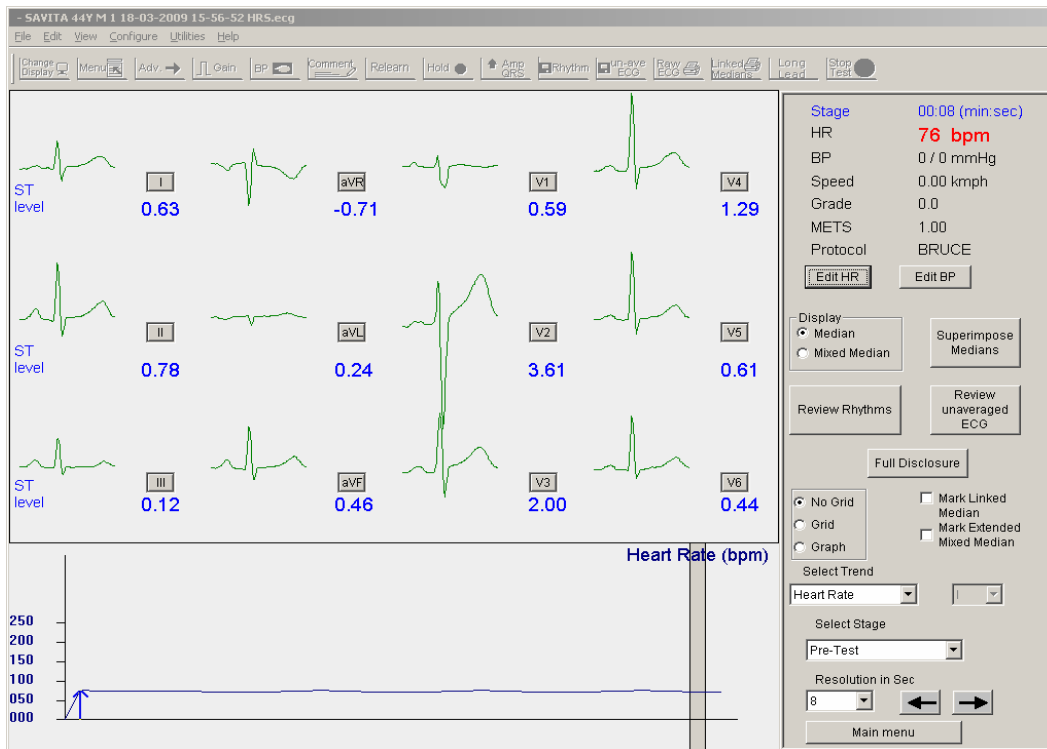
You can delete the test by selecting the patient from the list and pressing '**Delete**' button. The application ask for confirm action before deleting the test.

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.

Select Patient					
Patient Name	Age	Sex	Sr.No	Date	
Mr.Parshuram Kudchikar	23	M	13	28-06-2002	09:47
Mr.Tushar Patil	21	M	12	28-06-2002	09:44
Sidharth Prakash Lodha	25	M	11	26-06-2002	12:03

Buttons: Delete, OK, Cancel

**Fig 5.2: Patient Details.**



**Fig.5.3: Review screen.**

Review screen has the following data on the screen,

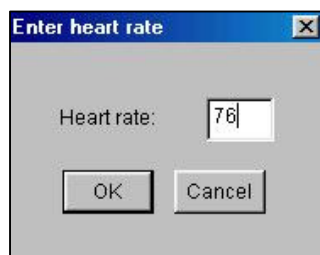
- Medians of all 12 leads.
- Heart rate trend.
- Review control panel.

Review control panel has following controls 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.

## 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: Heart rate entry.**



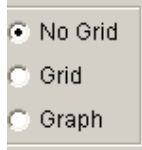
**Fig.5.5: Edit BP.**

## **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.

## **2A. Grid display**

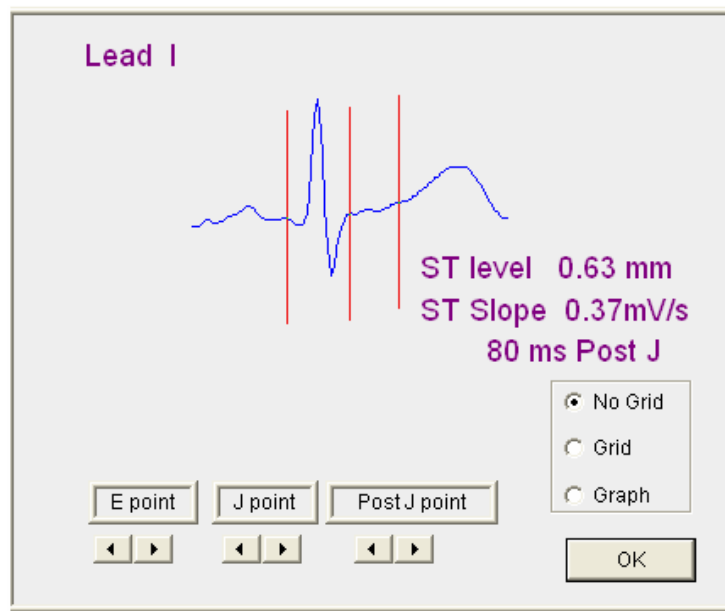
Use this button to view ECG with grid or with graph



**Fig.5.5A: Edit grid.**

## **3. Zoom Median-**

To view zoom medians and edit E, J and Post-J points, press lead name button adjacent to median. Dialog box as shown in fig 5.6 will appear on the screen. The pressed lead is enlarged and displayed.



**Fig 5.6: 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.

#### 4. Mixed median-

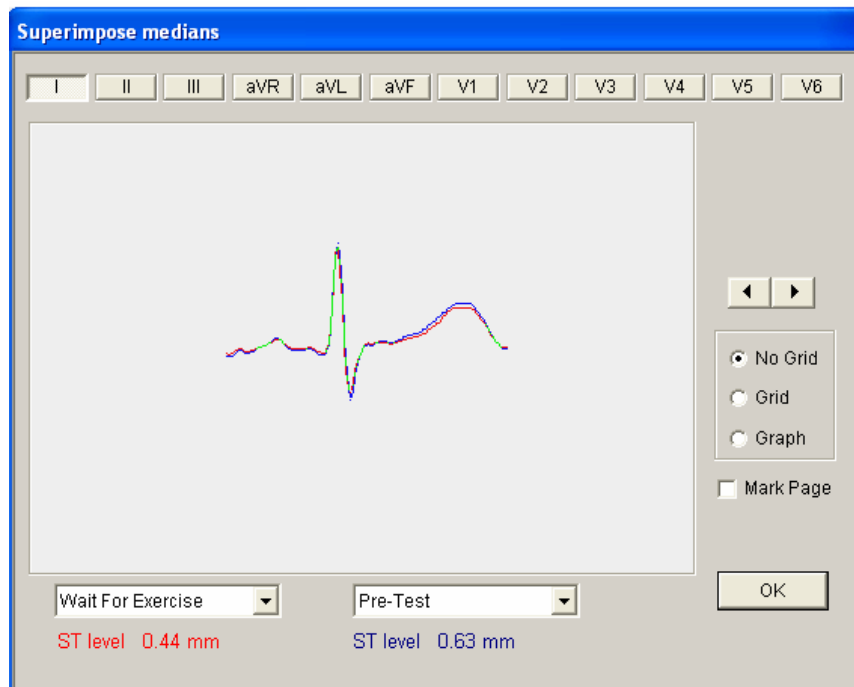
To view raw ECG with medians select ECG radio button. 2.5 seconds ECG of all 12 leads with medians at current cursor position is displayed. ST levels are display below lead names.



**Fig 5.7: Mixed medians ECG screen.**

#### 3. Superimpose median-

1. To compare the two medians of any stages, click '**Superimpose median**' button. Dialog box as shown in fig. 5.8 with 'wait for exercise' median on left and median at current cursor position on right.
2. Two combo boxes at the bottom of superimpose median screen are provided to select medians of different stages for comparison. Median of any stage can be compared with any other stage.
3. Using left and right arrow keys, median on right side can be moved to left or right for exact superimposition and comparison. Refer fig. 5.8.
4. Check the check box named '**Mark Page**' to mark the current page for printing.
5. To view the grid or graph on the current screen click on the Grid or Graph buttons.
6. Press the spin button to move the right side median towards right or left for comparison.



**Fig.5.8: Superimposing the median.**

7. Press '**OK**' button to exit this screen and go to median screen.1.

#### **4. Review Rhythms-**

Press '**Review Rhythms**' button to view the rhythms recorded while conducting the test.

The screen is as shown in fig 5.10. This screen has following details,



**Fig.5.10: Review rhythm screen.**

- 12 lead ECG of 4 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 leads screen as shown in the fig. 5.11. 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.5.11: 6 Lead review rhythm.**

## **7. 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.5.12,

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.
5. '**Display medians**' to move back to the main review screen.



**Fig.5.12: Unaveraged ECG.**

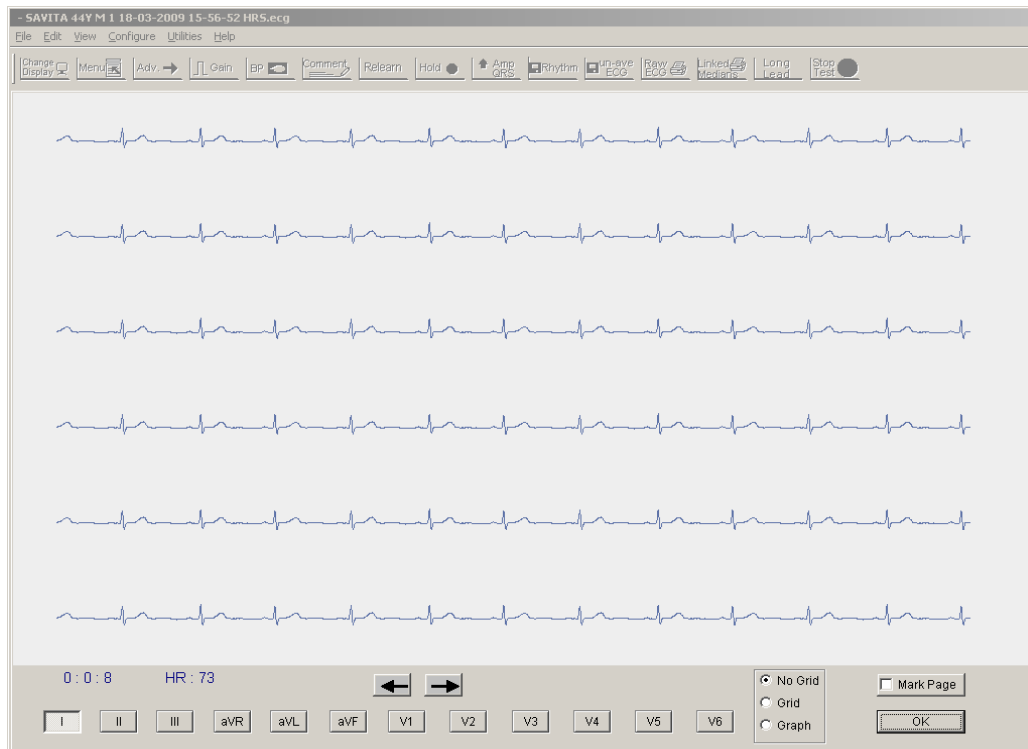
## **8. Full disclosure-**

To view the ECG data of one minute at the current arrow cursor position of the heart rate trend, press '**Full disclosure**' button on Review control panel.

Figure 5.12, has have the following details,

- 12 buttons having the lead names. By clicking those buttons user can view the ECG of one min. of the selected lead.
- At the right corner of the screen information like **time in hrs and min, heart rate and the current stage** of that particular instance is displayed.
- Click on the Grid or Graph or No Grid buttons to display the Grid or Graph or No Grid on the screen.
- For marking the current page for printing check '**Mark Page**' check box.
- For viewing previous or next one min. data press left or right arrow buttons.
- Press '**OK**' to return back to main review screen.





**Fig.5.13: Full disclosure.**

#### **8. Mark page**

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

#### **9. Select stage**

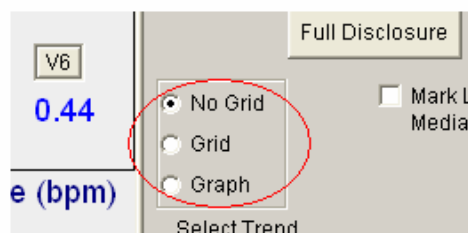
To view median at the end of different stages, select stage from 'Select stage' combo box.

#### **10. Resolution in sec**

To move the arrow cursor on the trend for viewing the medians or ECG of that particular instance, use the arrow buttons. User can select the step of arrow movement using '**Resolution in sec**' combo box. Resolution can be varied in steps of 8,16,32,48 and 56. Trends in trend report also get change as per the selection of the resolution.

#### **11. 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 5.14.



**Fig 5.14: Grid.**

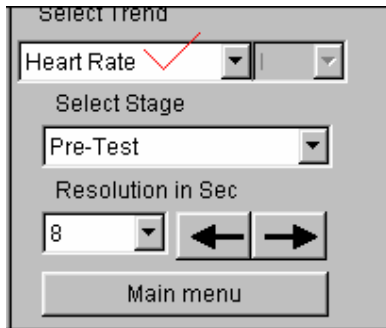
## 12. Mark Linked Median-

To have printouts of the Link Median at the current cursor position on trend, check '**Mark Linked Median**' check box.

## 13. Mark Extended Mixed Median

To have printouts of the Extended Mixed Median at the current cursor position on trend, check '**Extended Mixed Median report**' check box.

### Select trends

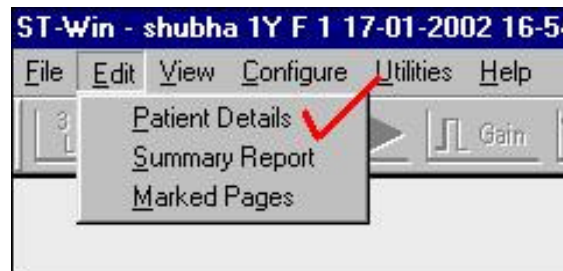


To view the different trends like ST slope, ST Level and J amplitude, Blood pressure, select the trend from the select trend drop down list present on the review control panel as shown in fig 5.15.

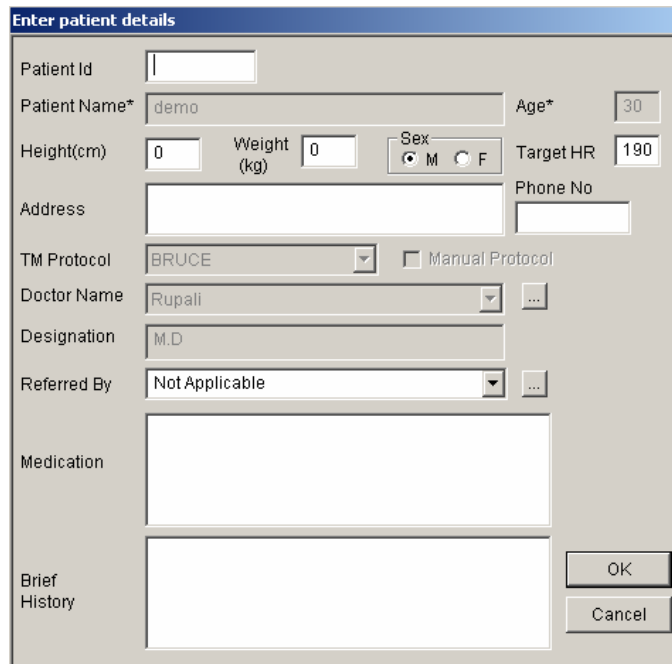
**Fig.5.15: Select trend.**

## 14. 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.5.17 is displayed on the screen.



**Fig.5.16: Edit menu.**



The 'Enter patient details' dialog box contains the following fields and controls:

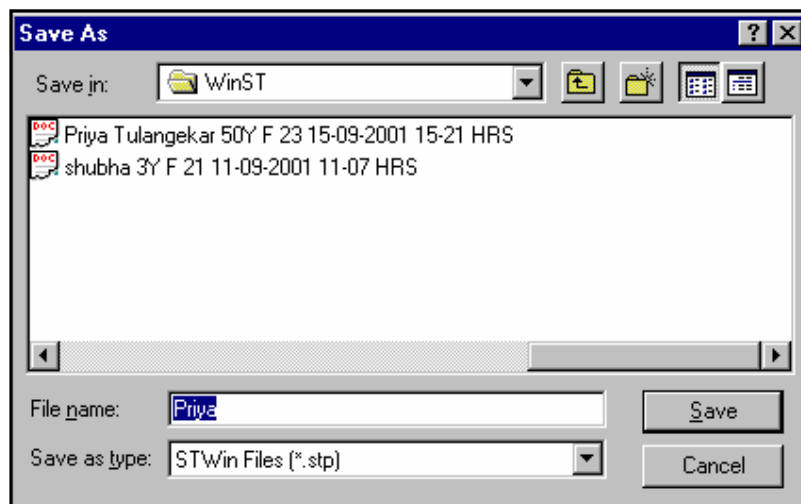
- Patient Id:** A text input field.
- Patient Name\*:** A text input field containing 'demo'.
- Age\*:** A text input field containing '30'.
- Height(cm):** A text input field containing '0'.
- Weight (kg):** A text input field containing '0'.
- Sex:** Radio buttons for 'M' (selected) and 'F'.
- Target HR:** A text input field containing '190'.
- Address:** A large text input field.
- Phone No:** A text input field.
- TM Protocol:** A dropdown menu showing 'BRUCE'.
- Manual Protocol:** An unchecked checkbox.
- Doctor Name:** A dropdown menu showing 'Rupali'.
- Designation:** A dropdown menu showing 'M.D'.
- Referred By:** A dropdown menu showing 'Not Applicable'.
- Medication:** A large text input field.
- Brief History:** A large text input field.
- Buttons:** 'OK' and 'Cancel' buttons at the bottom right.

**Fig.5.17: Patient detail dialogue box.**

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

### 15. **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 5.18 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.



The 'Save As' dialog box shows the following details:

- Title Bar:** 'Save As' with standard window controls.
- Save in:** A dropdown menu showing 'WinST'.
- File List:** A list of files with icons, including 'Priya Tulangekar 50Y F 23 15-09-2001 15-21 HRS' and 'shubha 3Y F 21 11-09-2001 11-07 HRS'.
- File name:** A text input field containing 'Priya'.
- Save as type:** A dropdown menu showing 'STWin Files (\*.stp)'.
- Buttons:** 'Save' and 'Cancel' buttons at the bottom right.

**Fig.5.18: Save test.**

### 17. **Main menu-**

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

## 6. Printing reports-

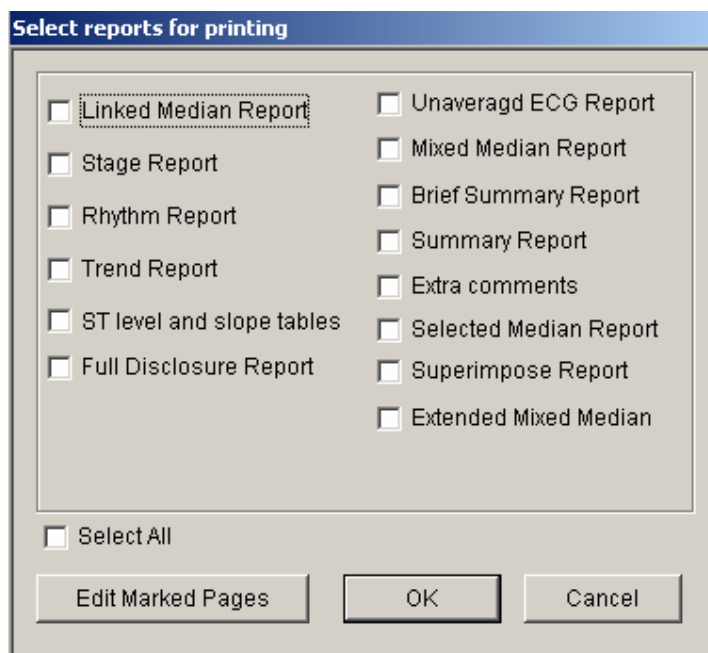
### 1. Print setup

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.

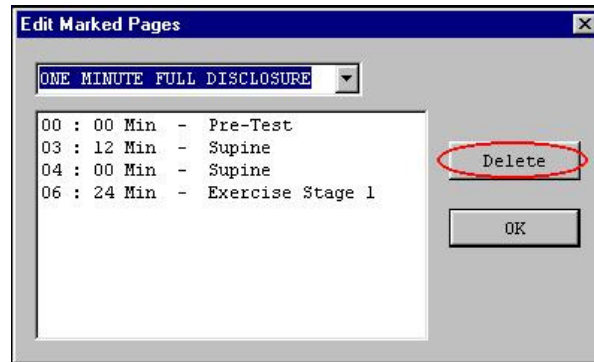
### 2. Print

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.5.17.
- 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.

Tabular summary report								
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

Back OK

**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.

**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.

**Fig 6.4: Select summary report option.**

Along with following buttons,

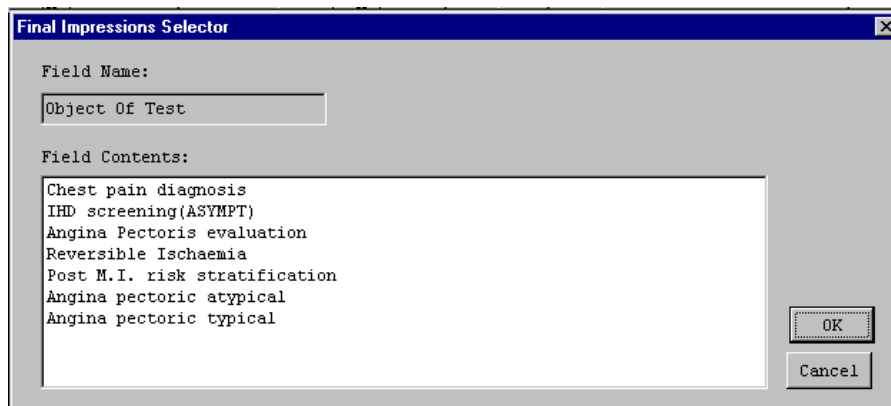
- Object of Test
- Risk factor
- Activity
- Other Investigation
- Reason for termination

- f. Exercise Tolerance
- g. Exercise Induced arrhythmias
- h. Haemodynamic response.
- i. Chronotropic response.
- j. Test conclusion.

You can also type the conclusion in the in the text boxes given in front which will appear in the print out.

### **To select the Object of Test-**

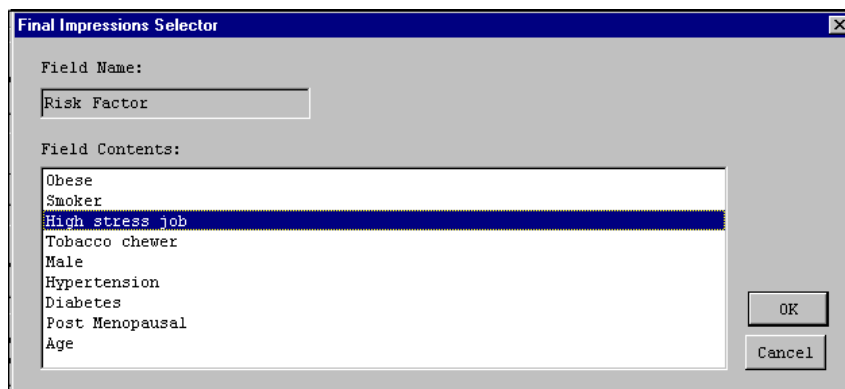
To add the purpose of conducting the test, press '**Object of Test**' button. The '**Final impression selector**' as shown in fig.6.5 is displayed. Select the object of test from the list given and click on '**OK**' button. Multiple selections are allowed. Your object of test will be included in '**Select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



**Fig 6.5: Final impression selector.**

### **To select the Risk Factor**

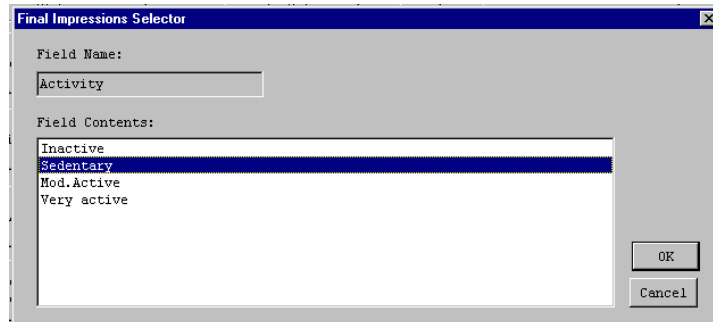
Similarly select the risk factor of the patient by pressing '**Risk Factor**' button. Screen as shown in fig. 6.6 is displayed. Select the appropriate option by clicking on the option and then press '**OK**' button.



**Fig: 6.6. Risk factor.**

### **To select Activities**

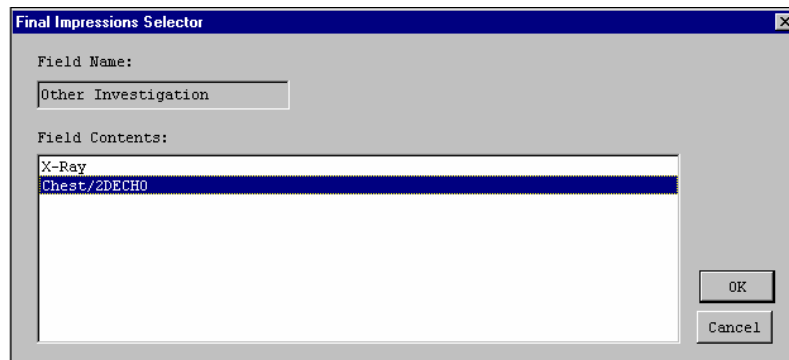
Press '**Activity**' button to add the patient activity in summary report. Select the required parameters and click '**OK**' button.



**Fig 6.7: Activity.**

### **To select other investigation**

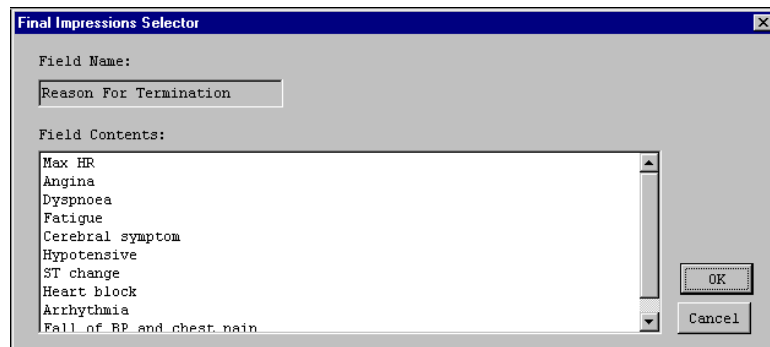
To keep the information about the previous test conducted like X-ray etc. before stress test, press the '**Other Investigation**' button the screen as shown in fig 6.8 is displayed, select the option and click on '**OK**' button.



**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.

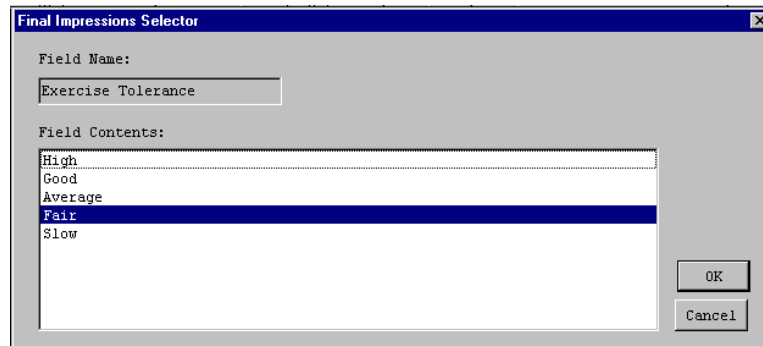


**Fig: 6.9. Reason for termination of test**



### **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.

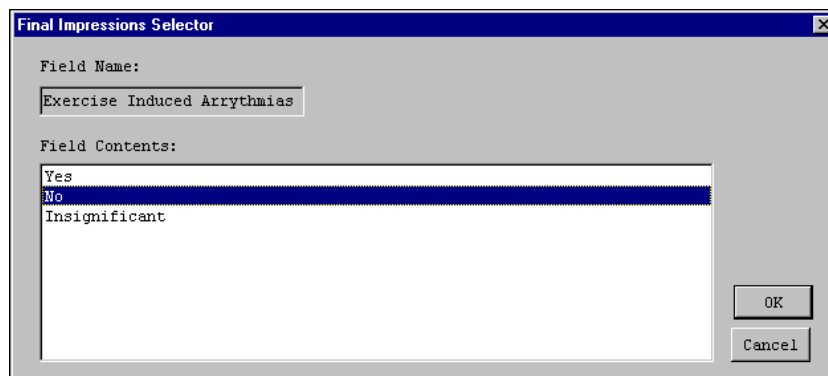


The screenshot shows a window titled "Final Impressions Selector". It has a "Field Name:" label followed by a text box containing "Exercise Tolerance". Below this is a "Field Contents:" label followed by a list box containing the following items: "High", "Good", "Average", "Fair", and "Slow". The "Fair" item is highlighted with a blue background. At the bottom right of the window are two buttons: "OK" and "Cancel".

**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.

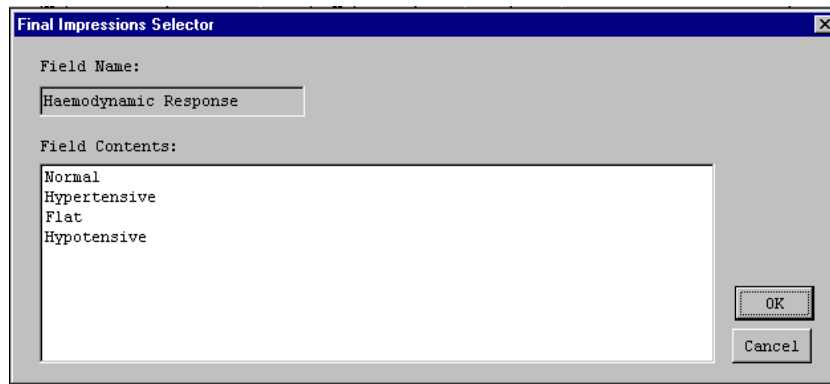


The screenshot shows a window titled "Final Impressions Selector". It has a "Field Name:" label followed by a text box containing "Exercise Induced Arrhythmias". Below this is a "Field Contents:" label followed by a list box containing the following items: "Yes", "No", and "Insignificant". The "No" item is highlighted with a blue background. At the bottom right of the window are two buttons: "OK" and "Cancel".

**Fig 6.11: Exercise induced arrhythmia.**

### **To select Haemodynamic Response**

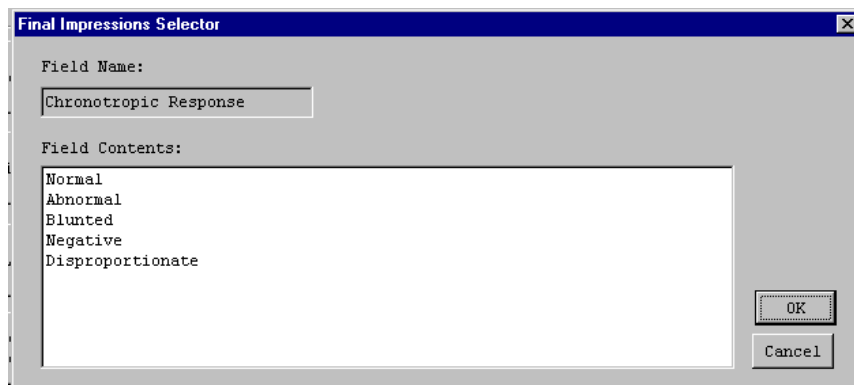
Press '**Haemodynamic response**' button to select the Haemodynamic response of the patient and to include it into the summary report as shown in fig 6.12. Select the response by clicking the response by the mouse. The response gets added in the summary report.



**Fig 6.12: Haemodynamic response.**

### **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.

Final Impression : Screen 4 / Page 2

HyperTensive Response Add

HYPERTENSIVE RESPONSE

Back Print Summary Report OK Cancel

**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 Level Table:

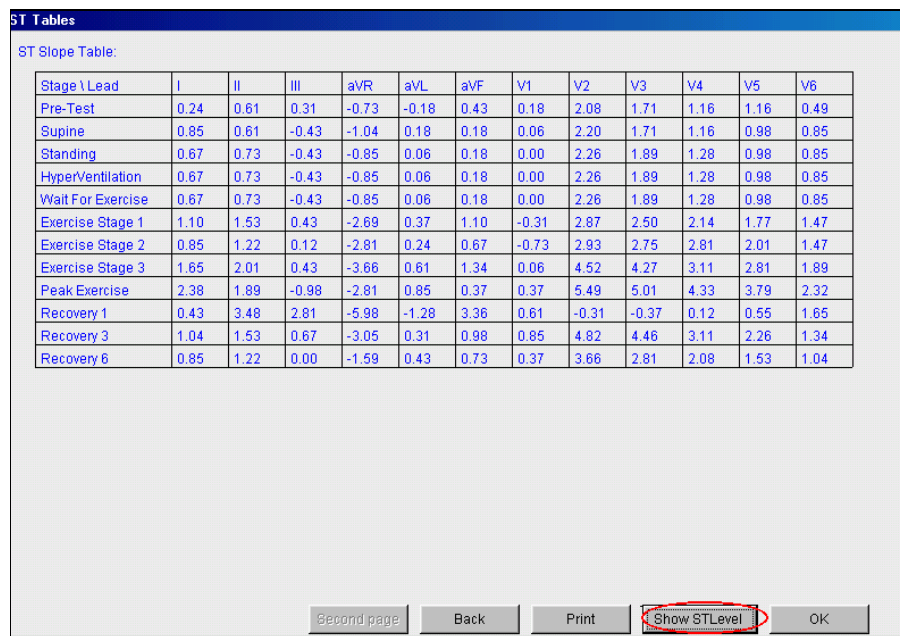
Stage \ Lead	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6
Pre-Test	0.54	1.37	0.83	-0.93	-0.17	1.07	0.46	2.88	2.71	1.78	1.61	0.90
Supine	0.81	1.59	0.56	-1.12	0.07	1.05	0.42	3.05	2.54	1.76	1.49	0.98
Standing	0.78	1.59	0.68	-1.10	0.05	1.07	0.37	3.08	2.59	1.78	1.49	0.98
HyperVentilation	0.78	1.59	0.68	-1.10	0.05	1.07	0.37	3.08	2.59	1.78	1.49	0.98
Wait For Exercise	0.78	1.59	0.68	-1.10	0.05	1.07	0.37	3.08	2.59	1.78	1.49	0.98
Exercise Stage 1	1.73	2.20	0.49	-1.98	0.61	1.27	0.32	4.13	3.52	2.86	2.37	1.88
Exercise Stage 2	1.37	1.47	-0.10	-1.47	0.73	0.71	0.27	5.10	4.59	3.76	3.22	1.98
Exercise Stage 3	2.08	1.61	-0.46	-1.73	1.25	0.63	0.66	5.64	4.86	3.71	2.78	1.86
Peak Exercise	2.12	1.32	-0.88	-1.71	1.51	0.29	0.56	5.49	4.96	4.10	3.03	1.71
Recovery 1	2.59	5.40	2.74	-3.98	-0.10	4.10	1.20	7.59	7.45	6.20	5.23	3.86
Recovery 3	1.51	2.30	0.83	-1.90	0.32	1.61	0.71	6.18	5.54	3.88	2.91	1.83
Recovery 6	0.98	1.20	0.20	-1.05	0.39	0.68	0.56	3.39	2.54	1.83	1.37	0.90

Second page Back Print Show STSlope OK

**Fig 6.14: ST-Level.**

## ST Slope

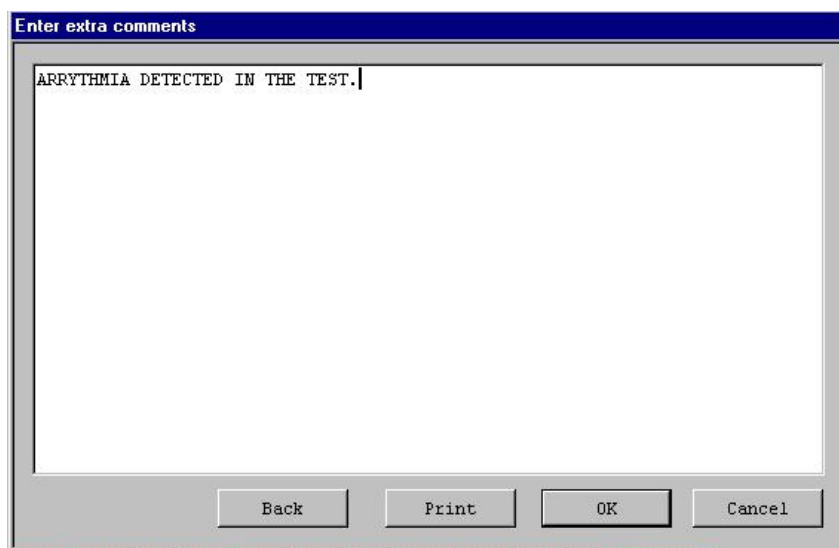
This dialog box shows ST-Level of entire stages of all leads for the test, along with the 'Print', 'Show ST-Slope Table', 'Back' and 'OK' button. You can take the printout of the ST-Level table by clicking the 'Print' button. Press 'OK' button to move to next screen.



Stage \ Lead	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6
Pre-Test	0.24	0.61	0.31	-0.73	-0.18	0.43	0.18	2.08	1.71	1.16	1.16	0.49
Supine	0.85	0.61	-0.43	-1.04	0.18	0.18	0.06	2.20	1.71	1.16	0.98	0.85
Standing	0.67	0.73	-0.43	-0.85	0.06	0.18	0.00	2.26	1.89	1.28	0.98	0.85
HyperVentilation	0.67	0.73	-0.43	-0.85	0.06	0.18	0.00	2.26	1.89	1.28	0.98	0.85
Wait For Exercise	0.67	0.73	-0.43	-0.85	0.06	0.18	0.00	2.26	1.89	1.28	0.98	0.85
Exercise Stage 1	1.10	1.53	0.43	-2.69	0.37	1.10	-0.31	2.87	2.50	2.14	1.77	1.47
Exercise Stage 2	0.85	1.22	0.12	-2.81	0.24	0.67	-0.73	2.93	2.75	2.81	2.01	1.47
Exercise Stage 3	1.65	2.01	0.43	-3.66	0.61	1.34	0.06	4.52	4.27	3.11	2.81	1.89
Peak Exercise	2.38	1.89	-0.98	-2.81	0.85	0.37	0.37	5.49	5.01	4.33	3.79	2.32
Recovery 1	0.43	3.48	2.81	-5.98	-1.28	3.36	0.61	-0.31	-0.37	0.12	0.55	1.65
Recovery 3	1.04	1.53	0.67	-3.05	0.31	0.98	0.85	4.82	4.46	3.11	2.26	1.34
Recovery 6	0.85	1.22	0.00	-1.59	0.43	0.73	0.37	3.66	2.81	2.08	1.53	1.04

**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

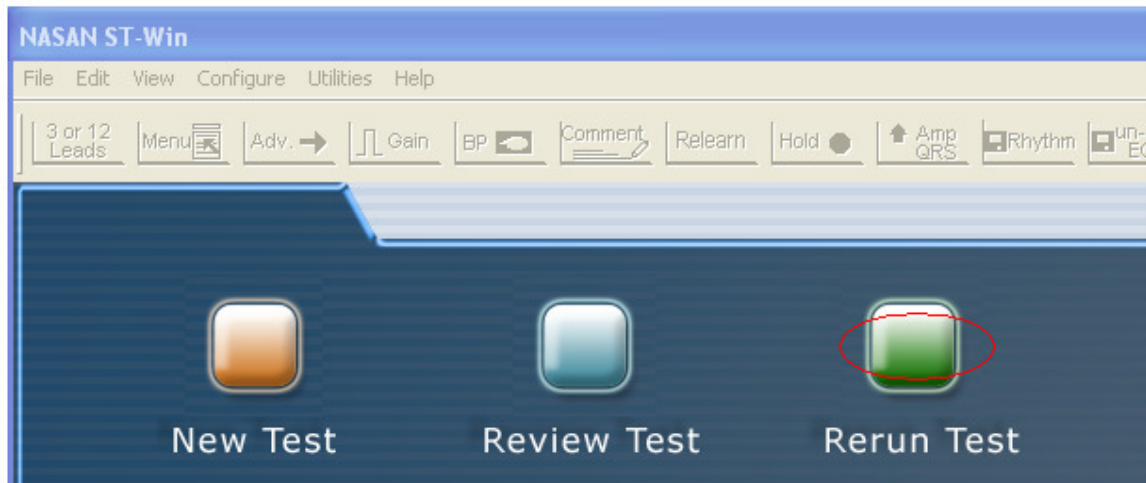
ARRYTHMIA DETECTED IN THE TEST.

Back Print OK Cancel

**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.**

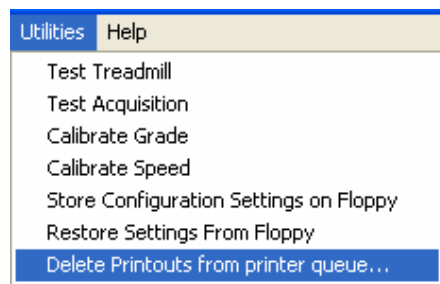
Patient details dialog box with previously filled details of the patient is displayed.  
Press '**OK**' button to start same test again from first stage i.e. Pre test.

## 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: Test treadmill.**

### **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 it's 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**

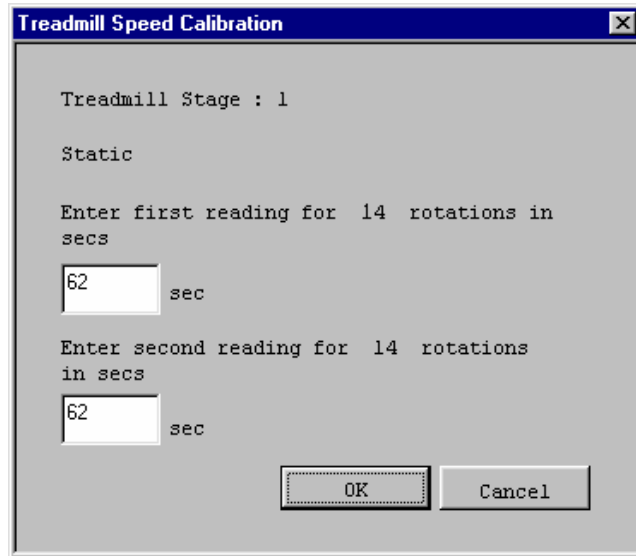
2. After the treadmill reaches its minimum elevation press '**OK**' button. When 'OK' is pressed calibration constants for grade are calibrated and stored. These calibration constants are displayed in ST-Win configuration dialog box.
3. If an error is detected this message appear on the screen,



**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.**

The treadmill will gain the speed. Above explained process will be carried out upto 7 stages of BRUCE protocol. Speed calibration constants are calculated and saved on pressing OK button.

➤ **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.

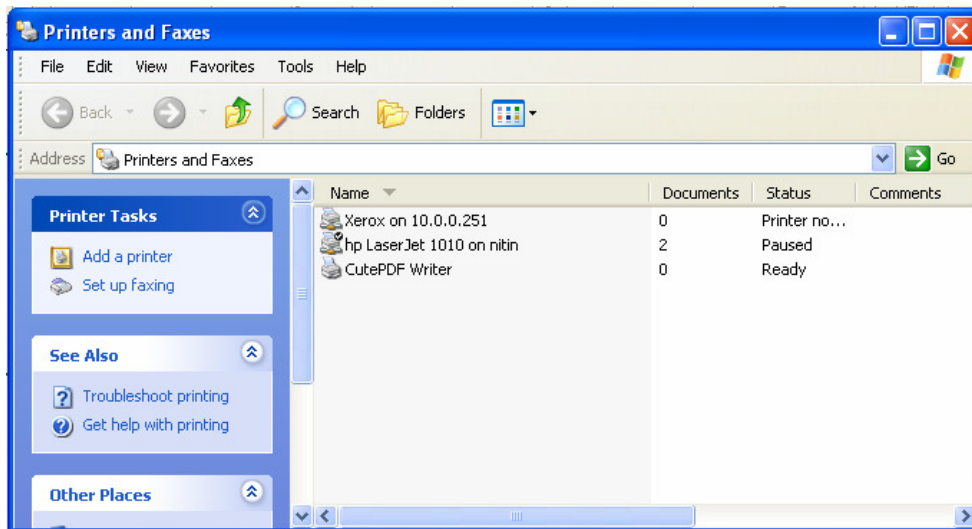
➤ **Restore settings from the floppy.**

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.

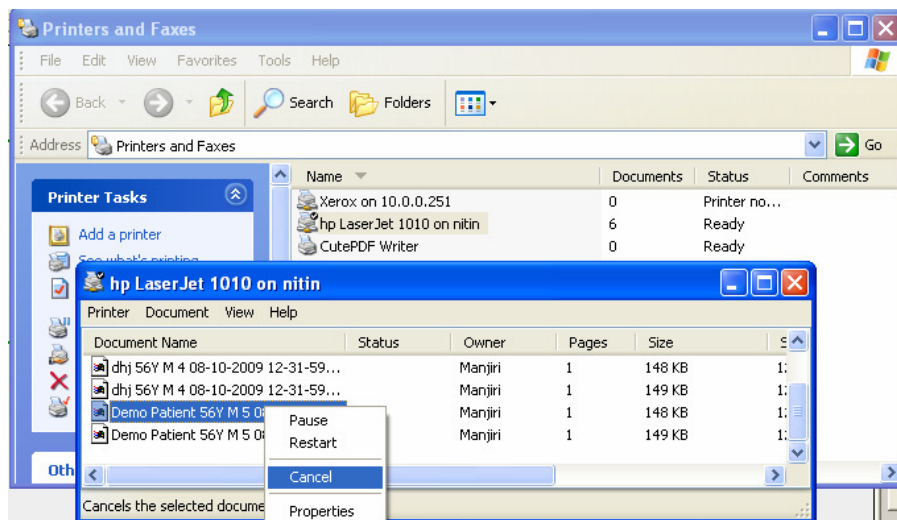
➤ **Delete printouts from printer queue ...**

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.



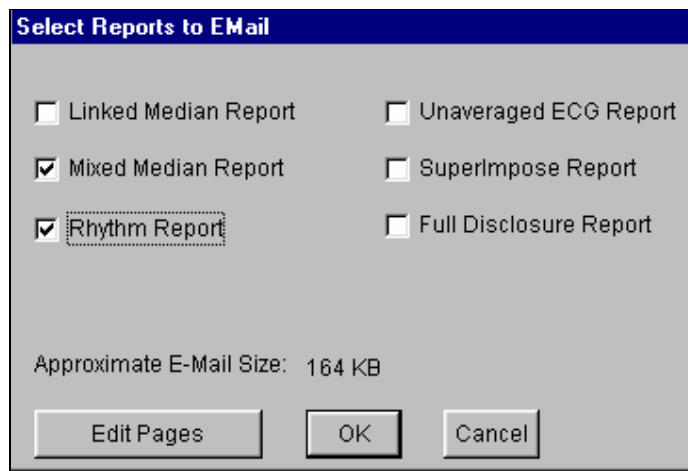
It will display that documents stucked in the queue and if those documents in the queue are not required then right click on it and select 'cancel' option as shown in above figure. It will delete the documents in queue.

## 9. Enhanced features-

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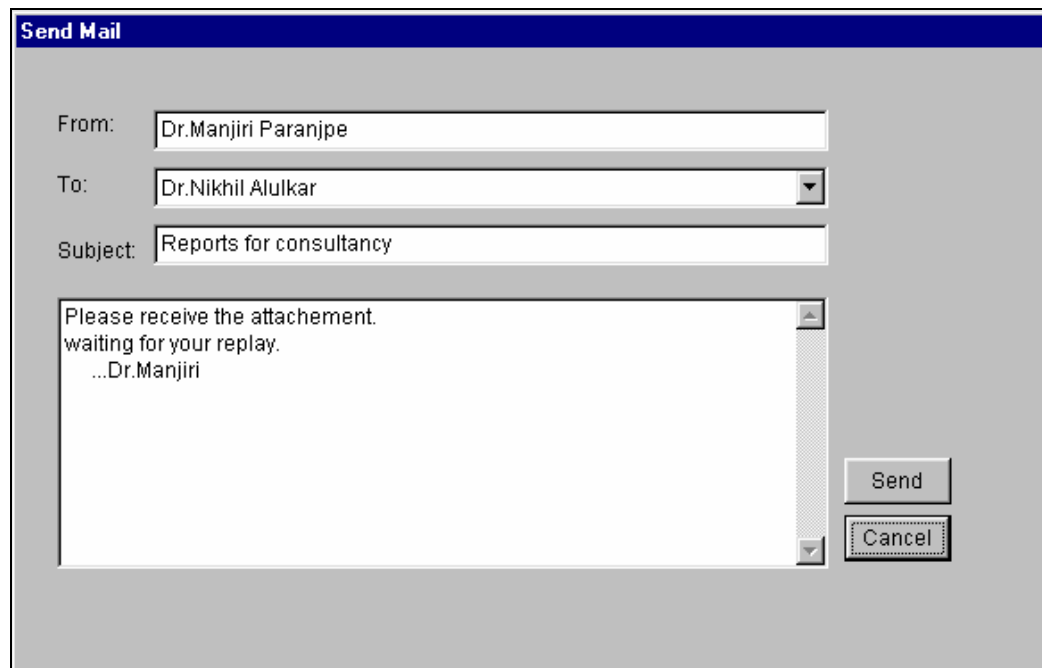
### **Sending reports through mail-**

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.

A screenshot of a 'Send Mail' dialog box. The title bar is blue with the text 'Send Mail' in white. The dialog has a light gray background. It contains three input fields: 'From:' with the text 'Dr.Manjiri Paranjpe', 'To:' with a dropdown menu showing 'Dr.Nikhil Alulkar', and 'Subject:' with the text 'Reports for consultancy'. Below these is a large text area containing the text: 'Please receive the attachement.', 'waiting for your replay.', and '...Dr.Manjiri'. To the right of the text area are two buttons: 'Send' and 'Cancel'.

**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-

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- ❑ **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 lead (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 deskjet.

# 11. Appendix A

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- **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 atrial 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.

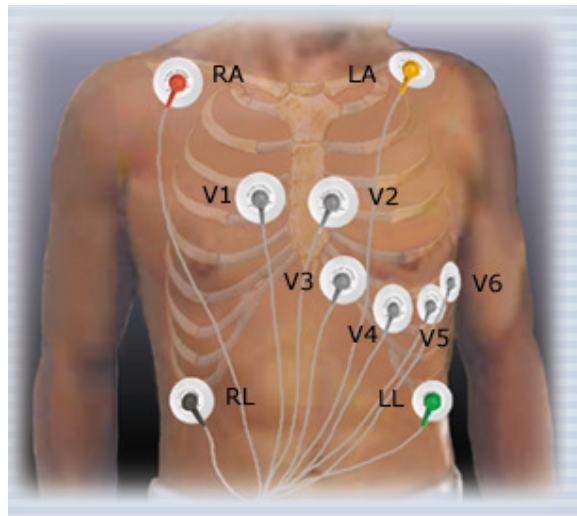
## 12. Appendix B

### 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-



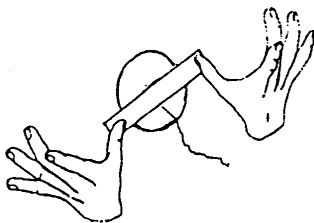
#### **Electrode Placement**

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 Fig.5.1



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 open from its plastic backing. Finger contact with the adhesive should be minimized and the 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

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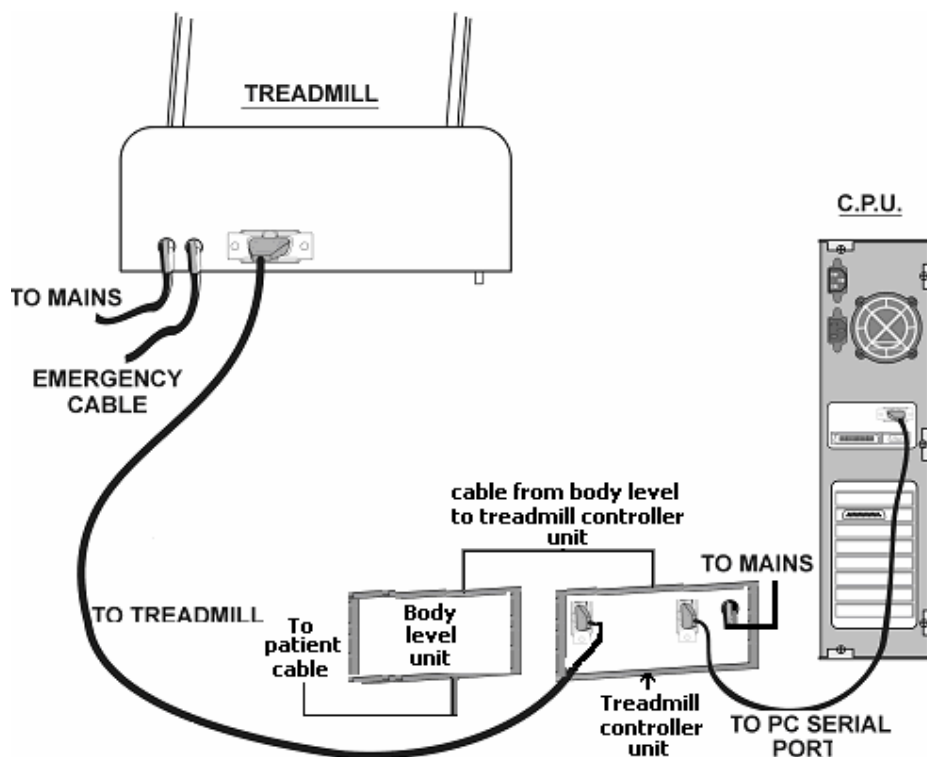
## **ST-Win acquisition unit specifications-**

- ❖ ECG Amplifier
  - Input dynamic range: +/-5mVAC+/-500mVAC
  - Gain: 1000
  - CMRR: >120dB
  - Frequency response: 0.5Hz 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.**

# ST WIN STANDARD

## TRAINING & INSTALLATION JOB CARD

### POINTS COVERED DURING TRAINING OF ST WIN STANDARD

S. NO	POINTS	SIGNATURE
1	UNPACK THE TREADMILL	
2	REPORT TO H.O. FOR ANY PHYSICAL DAMAGE	
3	UNPACK ALL BOXES & INFORM H.O. IF MATERIAL IS NOT AS PER PACKING LIST OR NOT AS PER PRODUCT REQUIREMENT.	
4	<p>ENSURE THAT SEPARATE EARTHING IS PROVIDED AND VOLTAGE BETWEEN EARTH AND NEUTRAL IS BELOW 3 VOLTS, IF NOT SO INFORM THE DOCTOR IMMEDIATELY .</p> <pre> graph TD     A[MAINS FROM ELECTRICITY BOARD AT CUSTOMER PLACE] --&gt; B[DISTRIBUTION BOX]     B --&gt; C[TO OTHER]     B --&gt; D[HIGH VOLTAGE EQUIPMENT LIKE X- RAY]     B --&gt; E[SPIKE PROTECTOR]     E --&gt; F[NASAN EQUIPMENT]         </pre>	
4 A)	ENSURE THAT THE LINE GETTING DISTRIBUTED FROM THE DISTRIBUTION BOX DOES NOT HAVE ANY HIGH VOLTAGE MACHINE IN PARALLEL WHERE THE NASAN MACHINE HAS TO BE CONNECTED. IN THIS CASE CHANGE EITHER PLACE A SPIKE PROTECTOR AS SHOWN OR CHANGE THE LINE.	
4 B)	ALSO ENSURE THAT THE AC MAINS HAS VOLTAGE RANGE IN BETWEEN 230 V ac + / - 10 %, IF THE VOLTAGE FLUCTUATES THAN USE STABILISER TO MAINTAIN THE VOLTAGE.	
5	ENSURE THAT SUPPLY FOR TREADMILL ,PC AND AMPLIFIER IS TAKEN FROM ONE AND SAME ELECTRICAL EXTENSION BOARD	
6	ENSURE THAT ALL ELECTRICAL POINTS HAVE PHASE ON YOUR RIGHT SIDE, NEUTRAL ON LEFT SIDE.	
7	FIX HANDLES AND ENSURE THAT INDEPENDENT TEST OF TREADMILL IS OK	
8	CONNECT TREADMILL TO AMPLIFIER, CONNECT AMPLIFIER TO PC SERIAL PORT	
9	WHILE TESTING TREADMILL INDEPENDENTLY, ENSURE THAT THE CONVEYOR BELT IS NOT TOUCHING EITHER SIDES OF THE TREADMILL	

10	IF PC IS SUPPLIED BY DOCTOR, ENSURE THAT 9 PIN SERIAL PORT IS AVAILABLE	
11	ENSURE THAT PC HAS A CDROM IF S/W IS SUPPLIED ON CD	
12	ENSURE THAT PRINTER WITH DRIVER SOFTWARE IS AVAILABLE, LOAD DRIVER S/W, SET PAPER SIZE TO 'A4' AND MODE TO 'LANDSCAPE'	
13	ENSURE THAT PC IS P-III 550 MHZ ONWARDS	

S.NO	TRAINING JOB CARD	SIGNATURE.
1	INSTALL STWIN S/W	
	<b>Note: Always connect Body level amplifier while taking New test and Calibration of treadmill.</b>	
2	SET THE TREADMILL TYPE ( COMPACT/TREADSTAR) AS PER REQUIREMENT	
3	TEST THE COMMUNICATION OF AMPLIFIER AND TREADMILL WITH PC	
4	DO SPEED CALIBRATION AND ENSURE THAT SPEED IS CORRECT IN PROTOCOL	
5	DO ELEVATION CALIBRATION AND ENSURE THAT ELEVATION IS CORRECT IN PROTOCOL	
6	ENTER THE HOSPITAL DETAILS AND NAME OF DOCTOR	
7	DO PRINTER SETTINGS IN STWIN AND IN PRINTER DRIVER S/W	
8	PREPARE DEMO PATIENT AND DO ONE TEST	
9	IF DUMMY TEST IS OK CALL DOCTOR FOR TRAINING	
10	EXPLAIN THE PRINTOUT SETTINGS IN STAGE REPORT PROTOCOL TO DOCTOR	
11	EXPLAIN WHAT WILL HAPPEN IF AUTOMATIC PRINTOUTS BUTTON IS CLICKED( ALL PRINTOUTS WHICH ARE ENABLED IN STAGE REPORT PROTOCOL, WILL GET PRINTED DURING TEST)	
12	EXPLAIN WHAT WILL HAPPEN IF ADVANCE STAGE BUTTON IS NOT CLICKED( DR. WILL NOT BE ABLE TO ADVANCE EXERCISE STAGE MANUALLY)	
13	ASK THE DOCTOR TO CONDUCT TEST INDEPENDENTLY UNTIL HE IS CONFIDENT.	
14	TAKE PRINTS AND TAKE INSTALLATION REPORT DULY SIGNED BY DOCTOR	

## **JOB CARD FOR HOW TO CONDUCT STRESS TEST WITH LIVE PATIENT**

S.NO	STEP	SIGNATURE.
1	EXPLAIN HOW TO PREPARE THE PATIENT WITH SPIRIT SOLUTION, ASK TO SHAVE THE PATIENT IF HE IS HAIRY	

2	RUN STWIN SOFTWARE ,(NEW TEST) , FILL IN PATIENT DETAILS, ASK DOCTOR TO SELECT THE REQD PROTOCOL AND EXPLAIN IMPORTANCE OF AGE WITH RESPAECT TO TARGET HEART RATE	
3	CHANGE QRS LEAD TO ANY LEAD NOT HAVING TALL R WAVE AND EXPLAIN EFFECT ON HEART RATE. (GO TO MENU, AND CLICK CHANGE QRS LEAD BUTTON TILL THE QRS LEAD APPEARS AS REQD)	
4	LET THE PATIENT BE SEATED ON CHAIR, START TEST AND EXPLAIN HOW TO CHECK ECG QUALITY IN PRE TEST STAGE.IF ECG QUALITY IS NOT GOOD , PREPARE THE PATIENT AGAIN.	
5	EXPLAIN WHAT IS MEANT BY MEDIANS DISPLAYED AT RIGHT HAND CORNER	
6	EXPLAIN THE TIME DISPLAYED ON THE RIGHT HAND CORNER	
7	EXPLAIN ABOUT THE AUTO MEDIAN SETTING AND HOW TO SET IT TO MANUAL MEDIAN, GO TO MENU, CLICK MANUAL MEDIAN BUTTON AND GO ON CLICKING CHANGE MEDIAN BUTTON TILL THE REQD MEDIAN IS DISPLAYED ON SCREEN	
8	AGAIN SET THE MEDIAN TO AUTO MODE, AND SHOW THAT THE LEAD HAVING MAXIMUM ST DEPRESSION IS DISPLAYED AS ENLARGED. ALSO EXPLAIN THAT THE ST LEVEL AND ST SLOPE IS DISPLAYED ON SCREEN.	
9	EXPLAIN ABOUT THE AUTO MEDIAN SETTING AND HOW TO SET IT TO MANUAL MEDIAN, (GO TO MENU, CLICK MANUAL MEDIAN BUTTON AND GO ON CLICKING CHANGE MEDIAN BUTTON TILL THE REQD MEDIAN IS DISPLAYED ON SCREEN)	
10	EXPLAIN ABOUT TARGET HEART RATE AND HOW IT IS CALCULATED	
11	EXPLAIN ABOUT THE QRS DETECTION LEAD AND ITS IMPORTANCE OF TALL R WAVE	
12	ADVANCE THE STAGE TO STANDING	
13	EXPLAIN HOW TO ENTER THE COMMENT PER STAGE	
14	EXPLAIN HOW TO CHANGE 3 LEAD MODE TO 12 LEAD MODE	
15	EXPLAIN THE MARKING OF E , J, POST J POINT IN AUTO MODE , TELL THE DOCTOR HOW TO CHANGE THESE POINTS IN MANUAL MODE. HERE GO TO MENU , CLICK 'MANUAL POINTS' , CLICK 'E' POINT AND SHOW HOW TO SHIFT IT TO LEFT OR RIGHT. ALSO EXPLAIN HIM THAT IN MANUAL MODE HE SHOULD CONFIRM THAT THE MARKINGS ARE CORRECT, AND AT HIGHER HEART RATES HE SHOULD CHANGE THE 'POST J' POINT TOWARDS RIGHT DIRECTION IF NEEDED	
16	ADVANCE TO SUPINE STAGE , HERE THE PATIENT SHOULD BE IN RESTING POSITION ASK HIM TO MEASURE THE BP AND ENTER IT IN PC BY CLICKING BP BUTTON. IF AUTOMATIC PRINTOUT IS ENABLED IN CONFIGURE MENU, AND PRINTOUT IS SELECTED FOR PRE-TEST STAGE IN STAGE REPORT PROTOCOL, ONE AUTOMATIC PRINT WILL COME AS PER PRINTOUT SETTINGS DONE.	
17	ADVACE TO STANDING STAGE , NOW THE PATIENT SHOULD BE IN STANDING POSITION, ASK DOCTOR TO ENTER THE BP, SAME AS IN SUPINE STAGE	
18	ADVANCE TO HYPERVENTILATION STAGE, NOW ASK THE PATIENT TO BREATH FAST AS FAR AS POSSIBLE, HERE ASK DOCTOR TO OBSERVE ANY ABNORMAL CHANGES IN ECG	
19	NOW ADVANCE TO WAIT FOR EXERCISE STAGE , NOW ASK THE PATIENT TO STAND ON CONVEYYOR BELT, SWITCH ON TREADMILL AND ENSURE THAT THE EMMERGENCY STOP SWITCH IS IN RELEASED CONDITION, CLICK MENU BUTTON , CLICK SPEED BUTTON , AND INCREASE THE SPEED SLOWLY . IN THIS STAGE DOCTOR CAN TEACH THE PATIENT HOW TO WALK ON TREADMILL	

	WHEN THE BELT STARTS ROTATING	
20	ADVANCE TO STAGE 1 , NOW ASK THE PATIENT TO REMAIN AT THE CENTRE OF THE BELT,OTHERWISE THE PATIENT MAY FALL DOWN	
21	IN STAGE ONE ASK THE DOCTOR TO KEEP WATCH ON ST LEVELS OF ALL LEADS	
22	EXPLAIN THE DOCTOR ABOUT TWO TIMINGS BEING DISPLAYED AT TOP, FIRST IS THE TOTAL TIMING OF THE TEST, AND THE BOTTOM ONE IS THE TIMING OF THE CURRENT STAGE	
23	AFTER TWO MINUTES A BEEP WILL BE HEARD AND BP ENTERING WINDOW WILL BE DISPLAYED. ASK DOCTOR TO TAKE BP OF THE PATIENT AND ENTER THE SAME IN THIS WINDOW	
24	AFTER THREE MINUTES THE STAGE WILL ADVANCE TO STAGE 2 , HERE TELL THE PATIENT THAT NOW THE SPEED WILL INCREASE AND HE HAS TO WALK FAST	
25	EXPLAIN THE DOCTOR THE USE OF RECORD RHYTHM BUTTON. IF PATIENT HAS ANY ARRHYTHMIA, DOCTOR CAN RECORD THIS RHYTHM BY CLICKING RECORD RHYTHM BUTTON.	
26	EXPLAIN USE OF RECORD UN-AVERAGED ECG BUTTON. BY CLICKING THIS BUTTON DOCTOR CAN RECORD THE UN-AVERAGED ECG AT THE PARTICULAR INSTANT	
27	LIKewise CONTINUE THE TEST TILL THE DOCTOR ASKS TO STOP THE TEST . FOR THIS, DOCTOR CAN CLICK STOP TEST BUTTON OR HE CAN PRESS F5 KEY ON THE KEYBOARD	
28	HERE THE PRESENT STAGE WILL BECOME PEAK EXERCISE STAGE, AND AFTER THIS RECOVERY 1 STAGE WILL START.	
29	AS SOON AS TREADMILL DE-ELEVATES TO BOTTOM AND THE BELT SPEED BECOMES ZERO, ASK THE PATIENT TO COME DOWN FROM TREADMILL AND SIT ON CHAIR.ASK DOCTOR TO PRESS EMERGENCY STOP SWITCH	
30	NOW THE PATIENT IS IN RECOVERY 1 STAGE, AFTER THREE MINUTES RECOVERY 3 WILL START, AFTER FIRST SIX MINUTES RECOVERY 6 WILL START.	
31	IF THE DOCTOR WANTS TO STOP THE TEST , ASK HIM TO CLICK REVIEW TEST BUTTON	
32	ASK DOCTOR TO REMOVE THE PATIENT CABLE AND THE ELECTRODES	
33	SHOW DOCTOR HOW TO EDIT SUMMARY REPORT ( CLICK EDIT AND CLICK SUMMARY REPORT)	
34	EXPLAIN THE DOCTOR THAT HE CAN TAKE ALL THE PRINTOUTS IN REVIEW MODE , IF HE DOESN'T WANT ANY ON LINE PRINTOUTS.	

**FOLLOWING MENU'S SHOULD BE COVERED IN THE SOFTWARE TRAINING**

SR NO	POINTS	SIGNATURE
1	EXPLAIN EACH OF FOLLOWING OPTIONS TO DOCTOR WITH THEIR IMPORTANCE	
2	<b>FILE:</b> NEW TEST	
3	REVIEW TEST	
4	RERUN TEST	
5	SAVE TEST FOR BACKUP	
6	REVIEW SAVED TEST	

7	PRINT PREVIEW	
8	PRINT SETUP	
9	<b>EDIT:</b> PATIENT DETAILS	
10	SUMMARY REPORT	
11	MARKED PAGES	
12	<b>CONFIGURE:</b> HOSPITAL DETAILS	
13	STANDARD SUMMARY OPTIONS	
14	CONFIGURE SYSTEM	
15	TREADMILL PROTOCOL	
16	PRINTING DETAILS	
17	<b>UTILITIES:</b> TEST TREADMILL	
18	TEST ACQUISITION	
19	CALIBRATE GRADE	
20	CALIBRATE SPEED	
21	STORE CONFIGURATION SETTING ON FLOPPY	
22	RESTORE SETTING FROM FLOPPY	
23	<b>LIVE TEST:</b> 3 OR 12 LEAD MODE	
24	TRACE 1	
25	TRACE 2	
26	QRS LEAD	
27	LEAD SETS	
28	MANUAL POINTS	
29	MANUAL MEDIAN	
30	AUTO MEDIAN	
31	CHANGE MEDIAN	
32	ADV	
33	GAIN	
34	BP	
35	COMMENTS	
36	RELEARN	
37	AMP QRS	
38	RHYTHM	
39	SAVE-UN AVE ECG	
40	SAVE-RAW ECG	
41	<b>PRINT-</b> LINKED MEDIAN	
42	<b>PRINT-</b> RAW ECG	
43	<b>CONFIGURE-</b> STAGE REPORT PROTOCOL	
44	EDIT HR	
45	EDIT BP	
46	DISPLAY MEDIAN	
47	DISPLAY MIXED MEDIAN	
48	SUPERIMPOSE MEDIAN	
49	REVIEW RHYTHM	
50	REVIEW UN AV ECG	
51	FULL DISCLOSURE	
52	SELECT TREND	
53	SELECT STAGE	
54	RESOLUTION	

**FEEDBACK FORM AFTER TRAINING :-**

Tick mark (✓) the selected one.

SR. NO.	POINTS	GOOD	BETTER	BEST
1	HOW WAS THE TRAINING			
2	COMMUNICATION SKILL OF TRAINER			
3	PROMPTNESS OF CONDUCTING TRAINING			
4	WAS THE TRAINER ABLE TO ANSWER ALL YOUR QUERIES			
5	DID THE TRAINER MADE THE PRODUCT USER FRIENDLY			

THIS IS TO DECLARE THAT MYSELF DR \_\_\_\_\_  
HAVE GONE UNDER THE TRAINING AND HAVE UNDERSTOOD THE POINTS COVERED IN  
THE TRAINING.

**NAME OF THE SERVICE ENGINEER:-****NAME OF THE DOCTOR :-****SIGNATURE OF THE SERVICE ENGINEER****SIGNATURE OF THE DOCTOR**

## 14. Appendix -D

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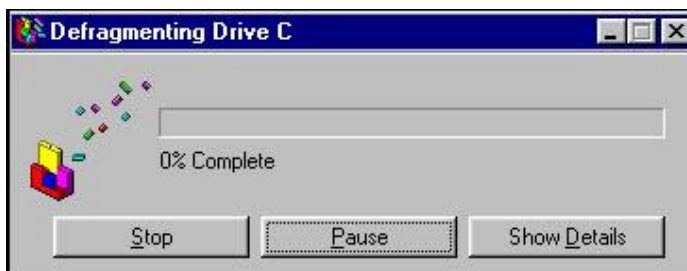
Defragmentation of the hard disk is a recommended job to do at least once in 3/4 months. This is because as the number of test conducted get increased doctors stats deleting the tests.

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: 11.1 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.***

1<sup>st</sup> floor Rangali Society, Opp. Karve statue, Kothrud-Pune-411038

Phone: 020-25391290, [www.nasanmedical.com](http://www.nasanmedical.com)

**Installation commissioning report- cum warranty**

**Certificate**

**Product Name –**

**Date: \_\_\_\_\_**

<b>Customer Name:</b>		<b>Equipment Location:</b>	
<b>Name of Hospital/Clinic/ Diagnostic Center:</b>		<b>Serial no. of machine:</b>	
<b>Address:</b>		<b>Invoice(Bill) No.</b>	
<b>Phone No.:</b>		<b>Dealer Name:</b>	
<b>Mobile no.:</b>			
<b>Name of the person / persons trained to use and operate the product/s:</b>			
<b>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.</b>			
<b>The warranty valid till 12 months from the date of installation or 13 months from date of invoice, whichever is earlier.</b>			
<b>Note:</b> 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.			
<b>Name and signature of NASAN's Sales/Service/Dealer Representative</b>		<b>Name and signature of customer (Please affix stamp / seal)</b>	

**Customer Copy**



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Phone: 020-25391290, [www.nasanmedical.com](http://www.nasanmedical.com)

**Installation commissioning report- cum warranty  
Certificate**

**Product Name –**

**Date: \_\_\_\_\_**

<b>Customer Name:</b>		<b>Equipment Location:</b>	
<b>Name of Hospital/Clinic/ Diagnostic Center:</b>		<b>Model No. (Serial no. of machine):</b>	
<b>Address:</b>		<b>Invoice No.</b>	
<b>Phone No.:</b>		<b>Dealer Name:</b>	
<b>Mobile no.:</b>			
<b>Name of the person / persons trained to use and operate the product/s:</b>			
<b>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.</b>			
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**NASAN Copy**