



# **STRESSVUE**

## **Exercise Stress Testing System**

**INSTRUCTIONS FOR USE**

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**PHILIPS**

## Notice

### About This Edition

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- the electrical installation of the relevant room or vehicle complies with the IEC or national requirements, and
- the instrument is used according to the instructions for use presented in this manual.

## European Directives

This product consists of hardware and software. The hardware carries the CE mark based on the declarations provided in the User's Guide for the IT hardware.

The StressVue software and the Philips thermal printer are class IIa medical devices under the Medical Device Directive 93/42/EEC and carry the **CE** 0123 mark accordingly.

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### WARNING

As with all electronic equipment, Radio Frequency (RF) interference between the StressVue system and any existing RF transmitting or receiving equipment at the installation site, including electrosurgical equipment, should be evaluated carefully and any limitations noted before the equipment is placed in service.

Radio frequency generation from electrosurgical equipment and close proximity transmitters may seriously degrade performance.

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### CAUTION

Use of accessories other than those recommended by Philips Medical Systems may compromise product performance.

IN THE U.S., FEDERAL LAW RESTRICTS THIS PRODUCT TO SALE ON OR BY THE ORDER OF A PHYSICIAN.

THIS PRODUCT IS NOT INTENDED FOR HOME USE.

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## Glossary

## Index

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# Safety Summary

This chapter provides important safety information related to the use of the StressVue Stress Exercise system.

**US FEDERAL LAW RESTRICTS THIS DEVICE TO SALE BY OR ON THE ORDER OF A PHYSICIAN.**

## Conventions Used in the *Instructions for Use*

The following contentions are used in the *StressVue Instructions for Use*, this guide.

---

**WARNING** Warning statements describe conditions or actions that may result in personal injury or loss of life.

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**CAUTION** Caution statements describe conditions or actions that may result in damage to equipment or software.











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**NOTE** Notes contain additional important information about a topic.



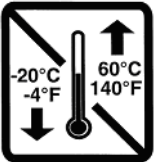



Refer to the manual(s) accompanying the StressVue Exercise Stress Testing System that pertain to the system's computer hardware for additional definitions of symbols that may be present.

## Safety Symbols Marked on the StressVue System

Symbol	Description
	Attention. See <i>StressVue Instructions for Use</i> and other product documentation for information.
	ECG physio isolation is type CF, defibrillator proof.

Symbol	Description
	Indicates that the system is receiving alternating currents.
	Fuse
	Equipotential grounding post used for establishing common ground between instruments.
	The connector near this symbol receives an incoming signal.
	CE mark.
	The number next to this symbol is the serial number of the system.
	The number next to this symbol is the product model number of the system.
	Green light illuminated when power is On.
	Green light illuminated when the paper is out or an error condition is detected.
	Pushing this button advances the paper to the next perforation and resets the paper error condition. Holding down this button for approximately 7 seconds resets the unit.

## Safety Symbols Marked on the StressVue Packaging

Symbol	Description
	Keep dry.
	Keep out of direct sunlight.
	Acceptable temperature range.
	Move and store packaging this end up.
	Fragile.
	Recycle the packaging materials after use.

## Important Patient and Safety Information

Patient and safety information is divided into several sections:

- StressVue Exercise Stress Testing system (see below)
- Medical isolation transformer (see page xiv)
- X-12 wireless transmitter (see page xv)

## Safety Information for the StressVue Exercise Stress Testing Systems

### Warning Statements for the StressVue System

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**WARNING** Failure to follow these warnings could affect both patient and operator safety.

---

- The device (stress test system) captures and presents data reflecting a patient's physiological condition that, when reviewed by a trained physician or clinician, can be useful in determining a diagnosis. However, the data should not be used as a sole means for determining a patient's diagnosis.
- Before running the StressVue system, Philips recommends that the operator perform leakage current testing according to UL 2601-1 requirements.
- The StressVue Exercise Stress Testing System is supplied with a power isolation transformer that must be used to maintain designed operator and patient isolation from the power source. The power isolation transformer must be plugged into a hospital grade outlet.
- The PC, Suntech Tango blood pressure monitor (if used), the thermal printer, and the monitor should use the isolation transformer as the power source.
- Do not touch accessible connector pins and the patient simultaneously.
- The use of equipment that applies high frequency voltages to the patient (including electrosurgical equipment and some respiration transducers) is not supported and may produce undesired results. Disconnect the patient data cable from the cardiograph, or detach the leads from the patient prior to performing any procedure that uses high frequency surgical equipment.
- When operating the StressVue system, ensure that the system and all other electrical equipment connected to or near the patient are effectively grounded.
- Connecting multiple medical electrical equipment to the same patient may pose a safety hazard due to the summation of leakage currents. Any combination of instruments should be evaluated by local safety personnel before being put into service.
- The StressVue system has been safety tested with the recommended accessories, peripherals, and leads, and no hazard was found when the system is operated with cardiac pacemakers or other stimulators.
- To maintain designed operator and patient safety, peripheral equipment and accessories used that can come in direct patient contact must be in compliance with UL 2601-1, IEC 60601-1, and IEC 60601-2-25.
- To maintain designed operator and patient safety, only use parts and accessories supplied with the device and available through Philips Medical Systems.

- To avoid the possibility of serious injury or death during patient defibrillation, do not come into contact with the device or patient cables. Additionally, proper placement of defibrillator paddles in relation to the electrodes is required to minimize harm to the patient.
- Periodically inspect the patient data cable, lead wires, cables, and power cords for any worn or cracked insulation to ensure that no inner conductive material is exposed. Discard worn accessories and replace them only with Philips Medical Systems accessories.
- A possible explosion hazard exists; do not use the device in the presence of flammable anesthetics.
- Before attempting to use the device for clinical applications, the operator must read and understand the contents of the manual and any documents accompanying the device.
- Do not connect any equipment or accessories to the StressVue system that are not approved by Philips Medical Systems or that are not IEC 60601-1 approved. The operation or use of non-approved equipment or accessories with the system is not tested or supported, and system operation and safety are not guaranteed.
- When using additional peripheral equipment powered from an electrical source other than the isolation transformer, the combination is considered to be a medical system. It is the responsibility of the operator to comply with IEC 60601-1-1 and test the medical system according to the requirements. For additional information, contact Philips Medical Systems.
- Only install Philips Medical Systems software on the stress test system. The installation or use of software not approved by Philips Medical Systems is strictly prohibited and system safety and performance are not guaranteed.
- Only use patient electrodes that are approved by Philips Medical Systems. The use of non-approved patient electrodes may degrade system performance.
- The Philips Medical Systems warranty is applicable only if you use Philips Medical Systems approved accessories and replacement parts. See Appendix E, “Ordering Options and Parts” for more information.

### Caution Statements for the StressVue System

---

**CAUTION** Caution statements describe conditions or actions that may result in damage to equipment or software.

---

- Do not use the StressVue system as a method for loading or operating commercially available software. Doing so might affect the performance of the StressVue application.

- If using the patient data cable to connect the Patient Interface Module to the StressVue PC, be sure to:
  - Thread the cable through the strain relief clip on the underside of the keyboard area on the cart (if used)
  - Position the PC and cart (if used) in such a manner as to eliminate the possibility of inadvertently tangling the cable or pulling it out of the PCMCIA receiver card in the PC
- To prevent possible damage to the to the device during transport and storage (while in original packaging), the following environmental conditions must be adhered to:
  - Ambient Temperature Range:  
-20°C to 65°C (-4°F to 149°F)
  - Relative Humidity Range:  
25% to 90% (non-condensing)
  - Atmosphere Pressure:  
700 hPa to 1060 hPa
- Allow the device to stabilize within its intended operating environment for a minimum of two hours prior to use. The allowable operating environment is as follows:
  - Ambient Temperature Range:  
15°C to 35°C (59°F to 95°F)
  - Relative Humidity Range:  
30% to 70% (non-condensing)
  - Atmosphere Pressure:  
700 hPa to 1060 hPa
- Do not attempt to clean the device or patient cables by submersing into a liquid, autoclaving, or steam cleaning.
- Wipe the exterior surface of the device and patient cables with a non-alcohol sterilizing disinfectant, then dry with a clean cloth.
- Conductive parts of the patient cable, electrodes and associated Type CF connections, including the neutral conductor of the patient cable and electrode, should not come into contact with other conductive parts, including earth ground.
- Do not pull or stretch patient cables as this could result in mechanical and/or electrical failures. Store patient cables after forming them into a loose loop.
- Ensure that all components are securely positioned on the system cart before using the StressVue system.
- Ensure that the patient data cable is tucked away from the system cart wheels when moving the cart. Ensure that the patient data cable does not present a hazard when pushing the cart.

- If using the Philips StressVue system cart, always lock the wheel brake on the system cart when the cart is not in use. Press down on the wheel brake to set or to release the wheel brake.
- Do not dispose of waste materials in trash. Follow local regulations for disposing of materials as small chemical waste.

### **Important Notes about the StressVue System**

- Proper patient preparation is important to proper application of ECG electrodes and operation of the device.
- Patient cables should be checked for cracks or breakage in its exterior properties prior to use.
- The arrhythmia detection portion of the StressVue is provided for the convenience of automatic documentation. The StressVue system offers no diagnostic opinion to the user; instead, it provides a high-fidelity instrument recording ECG waveforms during exercise for the purpose of providing the operator with a tool to expedite the documentation of a test for which he/she renders his/her own medical opinion.
- As defined by IEC 60601-1 and IEC 60601-2-25, the device is classified as follows:
  - Class I equipment
  - Type CF applied parts
  - Ordinary equipment
  - Not suitable for use in the presence of flammable anesthetics
  - Continuous operation



## Safety Information for the Medical Isolation Transformer

### Warning Statements about the Medical Isolation Transformer

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**WARNING** Failure to follow these warnings could affect both patient and operator safety.

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- Possible explosion hazard. Do not use in the presence of flammable anesthetics.
- Use of this transformer with equipment other than originally supplied, or surpassing the ratings, may cause damage, fire, or injury.
- Risk of electrical shock! Do not remove cover. Refer servicing to qualified service personnel. Grounding reliability can only be achieved when the equipment is connected to an equivalent receptacle marked “Hospital Grade.”
- When using additional peripheral equipment powered from an electrical source other than the isolation transformer, the combination is considered to be a medical system. It is the responsibility of the operator to comply with IEC 60601-1-1 and test the medical system according to the requirements. For additional information, contact Philips Medical Systems.

### Caution Statements about the Medical Isolation Transformer

---

**CAUTION** Caution statements describe conditions or actions that may result in damage to equipment or software.

---

- Before connecting your equipment to the isolation transformer, make sure the voltage selector (located above the power cord) matches the line voltage.

## Safety Information for the Ambulatory X-12 Transmitter

### Warnings about the Ambulatory X-12 Wireless Transmitter

---

**WARNING** Failure to follow these warnings could affect both patient and operator safety.

---

- Device (Ambulatory X-12 Transmitter) transmits data reflecting a patient's physiological condition to a properly equipped system and when reviewed by a trained physician or clinician can be useful in determining a diagnosis. However, the data should not be used as a sole means for determining a patient's diagnosis.
- Connecting multiple medical electrical equipment to the same patient may pose a safety hazard due to the summation of leakage currents. Any combination of instruments should be evaluated by local safety personnel before being put into service.
- To maintain designed operator and patient safety, peripheral equipment and accessories used that can come in direct patient contact, must be in compliance with UL 2601-1, IEC 60601-1 and IEC 60601-2-25.
- To maintain designed operator and patient safety, only use parts and accessories supplied with the device and available through Philips Medical Systems.
- To avoid the possibility of serious injury or death during patient defibrillation, do not come into contact with device or patient cables. Additionally, proper placement of defibrillator paddles in relation to the electrodes is required to minimize harm to the patient.
- Ensure that the electrodes or lead wires do not come in contact with any other conductive materials (including earth-grounded materials) especially when connecting or disconnecting electrodes to or from a patient.
- A possible explosion hazard exists, do not use the device in the presence of flammable anesthetics.
- Defibrillation protection is guaranteed only if the original patient cable is used.
- Simultaneous connection to other equipment may increase leakage current.
- Some stimulators may cause interference with the signal.
- ECG electrodes could cause skin irritation and should be examined daily. Reposition and change electrodes every 24 hours, though it may be necessary to do so sooner if signs of irritation or inflammation occur.
- Before attempting to use the device for clinical applications the operator must read and understand the contents of the manual and any documents accompanying the device.

- In some countries the use of the Ambulatory X-12 Transmitter (2400 MHz version) has been limited as follows:

<b>E</b>	Spain: Use is limited to channels in the range 8B to E6 (inclusive).
<b>F</b>	France: Use is limited to channels in the range 8E to A5 (inclusive).

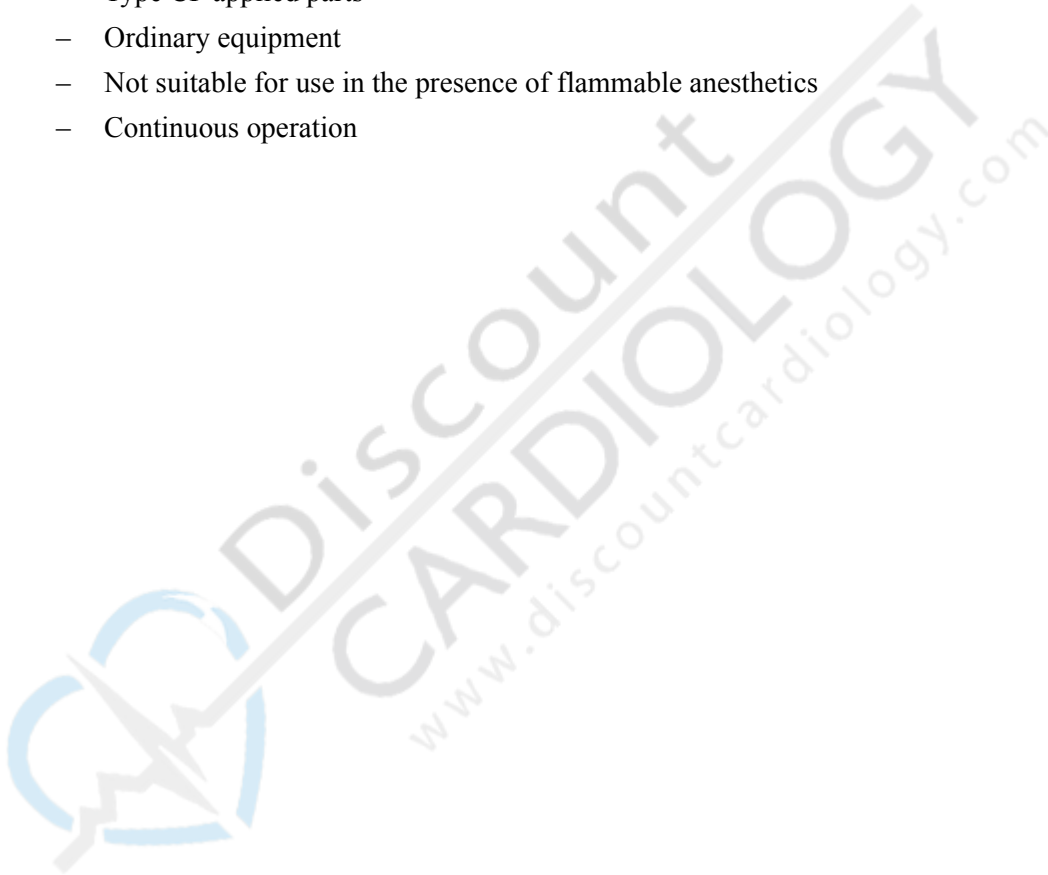
- The channel setting of the X-12, when used in the above listed countries, must be set accordingly.
- In the United States and Canada, use of the X-12 transmitter (600 MHz version) is regulated by Federal Communications Commission (FCC) rules, Part 15.
  - The X-12 must be used solely on the premises of health care facilities (see Part 15, section 15.242a).
  - A health care facility operating the X-12 must coordinate with the directors of existing nearby TV stations and Radio Astronomy Observatories to ensure compatible use. Minimum separation distances from such facilities may apply. It may be necessary to obtain written authorization from such facilities prior to installation and use of the X-12 (Part 15, section 15.242d,e).

### Caution Statements for the Ambulatory X-12 Transmitter

- To prevent possible damage to the keypad, do not use sharp or hard objects to depress keys, only use fingertips.
- Do not attempt to clean the device or patient cables by submersing into a liquid, autoclaving, or steam cleaning.
- Wipe the exterior surface of the device and patient cables with a non-alcohol sterilizing disinfectant, then dry with a clean cloth.
- Conductive parts of the patient cable, electrodes and associated Type CF connections, including the neutral conductor of the patient cable and electrode, should not come into contact with other conductive parts, including earth ground.
- The Ambulatory X-12 Transmitter and patient cable should be cleaned between each use.
- Do not pull or stretch patient cables as this could result in mechanical and/or electrical failures. Patient cables should be stored after forming them into a loose loop.
- The Ambulatory X-12 Transmitter only works with systems that are equipped with the appropriate option.
- No user-serviceable parts are inside. Any modification of this device may alter defibrillator protection. Any modification to any part of this device is to be performed by qualified service personnel only.
- The following equipment may cause interference with the RF channel: microwave ovens, diathermy units with LANs (spread spectrum), amateur radios, and government radar.

**Important Notes about the Ambulatory X-12 Transmitter**

- Proper patient preparation is important to proper application of ECG electrodes and operation of the device.
- Patient cables should be checked for cracks or breakage in its exterior properties prior to use.
- As defined by IEC 60601-1 and IEC 60601-2-25, the device is classified as follows:
  - Internally powered
  - Type CF applied parts
  - Ordinary equipment
  - Not suitable for use in the presence of flammable anesthetics
  - Continuous operation



# The StressVue Exercise Stress Testing System

## Intended Use

The device is a PC-based diagnostic tool intended to acquire, process, and store ECG data of patients undergoing stress exercise testing. The software records ECG, heart rate, and ST data, creates summary tables, trends, and a final report regarding a variety of cardiac data indices. The cardiac data provided by StressVue is reviewed, confirmed, and used by trained medical personnel to assist in the diagnosis of the electrocardiographic data reflecting the patient's physiological condition during stress exercise testing.

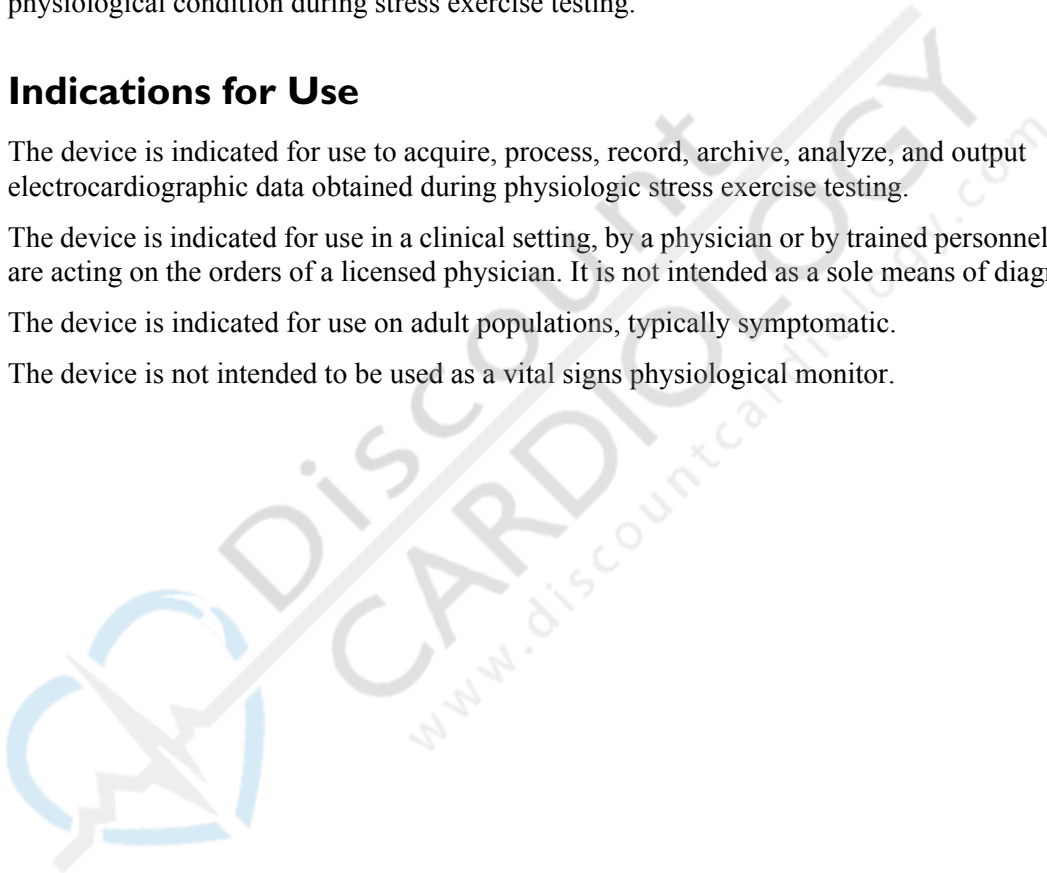
## Indications for Use

The device is indicated for use to acquire, process, record, archive, analyze, and output electrocardiographic data obtained during physiologic stress exercise testing.

The device is indicated for use in a clinical setting, by a physician or by trained personnel who are acting on the orders of a licensed physician. It is not intended as a sole means of diagnosis.

The device is indicated for use on adult populations, typically symptomatic.

The device is not intended to be used as a vital signs physiological monitor.



# Getting Started Using the StressVue Stress Exercise System

The StressVue system is a PC-based diagnostic tool for use in the exercise stress testing laboratory. Electrocardiographic data obtained during stress testing is acquired, processed, recorded, analyzed, output, and archived. The StressVue software creates summary tables, identifies trends, and generates a final statistical report, which trained clinicians review to assist in the diagnosis of the patient's condition.

The StressVue system interfaces to and controls a compatible treadmill or ergometer and non-invasive blood pressure monitor. The TTL output option allows selectable ECG signal to be sent to an Echo system for further tests.

This chapter provides the following information:

About the StressVue System . . . . .	1-2
System Components . . . . .	1-3
Patient Interface Module (PIM) . . . . .	1-5
About the Direct Connect Patient Interface Module (PIM), Model M12A . . . . .	1-5
Connecting the Direct Connect PIM to the StressVue Computer . .	1-6
About the Ambulatory X-12 Patient Interface Module . . . . .	1-8
Connecting the Patient Data Cable to the Patient Module. . . . .	1-9
About the Medical Isolation Transformer . . . . .	1-10
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## About the StressVue System

StressVue is a high-performance, PC-based dedicated color stress testing system, which provides automatic ST segment analysis and trending on all 12 leads. The diagnostic quality screen offers color superimposition comparison of current and reference complexes on both a 4x QRS and updated 12 lead median complexes. The system offers customizable screen formats and stores a high number of protocols and profiles. StressVue provides automatic ventricular ectopic beat detection and storage of up to 100 events for post-test review.

**NOTE** The arrhythmia detection portion of the StressVue application is provided for the convenience of automatic documentation. The StressVue system does not offer a diagnostic opinion; rather, it provides a high-fidelity instrument recording ECG waveforms during exercise, for the purpose of providing a tool to expedite the documentation of a test for which a clinician renders his/her own medical opinion.

The StressVue application interfaces with a treadmill or ergometer, and captures four phases of a patient exercise test:

- Pre-exercise
- Exercise
- Recovery
- Report

StressVue is also programmable, allowing you to customize the operational conditions to suit your specific needs. You can customize:

- Up to 100 different user profiles to meet the needs of individual physicians
- Up to 100 different exercise protocols
- Automatic 12-lead ECGs and prompts for blood pressure
- Full disclosure capability.
- Multiple final report formats with custom report sequence capabilities

StressVue runs on a PC with the Windows XP operating system. You control its functions using the keyboard and mouse.

## System Components

The StressVue system includes the following components:

- HP Compaq D510 or D530 convertible mini-tower
- HP L1702 17" flat panel monitor
- StressVue thermal printer or HP LaserJet 4200 Series with WinXP drivers
- Isolation transformer, 115V or 230V, depending on the country
- System cart (optional)
- One of the following transmitter/receiver sets:
  - Patient interface module (PIM) and direct connect PCMCIA card
  - X-12 digital transmitter (2500 MHz) and telemetry receiver PCMCIA card (not available in the US)
- PCMCIA card reader (internal)

For details about assembling the system, see the *StressVue Installation and Getting Started Guide*. For specifications for each component, see Appendix F, "Specifications and Requirements."

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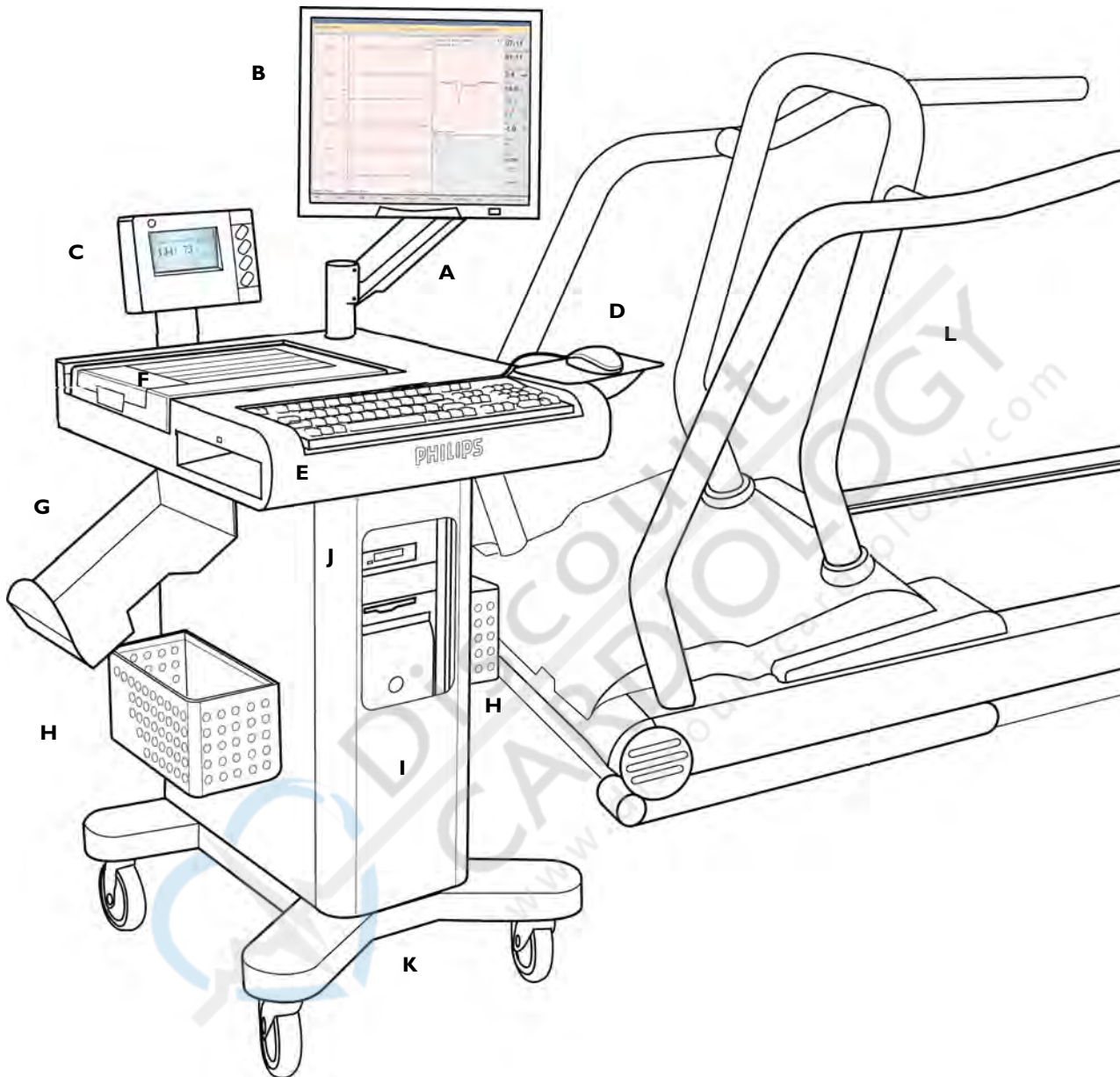
**WARNING** All components attached to the StressVue PC, including the PC, printer, monitor, and optional blood pressure monitor, must be plugged into a medical isolation transformer to ensure the system is properly grounded.

---

The StressVue system can be used with the following exercise equipment:

- TrackMaster TKM425 treadmill
- Ergometers using the Ergoline protocol, including the Ergoline 800, er800S, and er900S, as well as Lode Corival ergometers

Figure 1-1 StressVue system and cart



- A** Display arm and monitor (page F-1)
- B** StressVue application (see page 1-18)
- C** SunTech Tango blood pressure monitor (page 2-32)
- D** Mouse
- E** Keyboard
- F** Printer (page 1-10)
- G** Paper tray (page E-1)
- H** Storage baskets (page F-1)
- I** StressVue PC (page F-1)
- J** Card reader for use with the direct connect or wireless PCMCIA card for the patient module (page 1-5)
- K** StressVue utility cart
- L** Trackmaster treadmill

## Patient Interface Module (PIM)

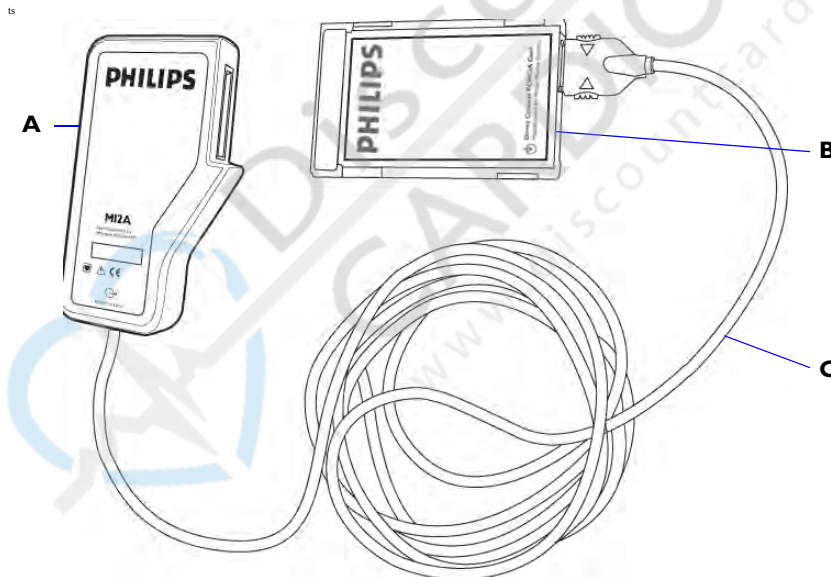
The Patient Interface Module (PIM) is a module connected to the LeadForm patient cable that records ECG activity on the patient and transmits this data to the StressVue system. It is attached to the patient with a belt or carrying case. The StressVue system offers both direct connect and wireless patient interface modules.

- The direct connect PIM ships with the standard system, and collects data from the patient via a patient data cable that connects to the StressVue PCMCIA ECG Processor card in the StressVue PC. For details, see “About the Direct Connect Patient Interface Module (PIM), Model M12A,” below.
- The wireless PIM is an option (A03, A04) available in some areas. The wireless PIM includes a transmitter and a PCMCIA card that acts as a receiver. For details, see “About the Ambulatory X-12 Patient Interface Module” on page 1-8.

For details about ordering components, including additional patient cables, see Appendix E, “Ordering Options and Parts.”

### About the Direct Connect Patient Interface Module (PIM), Model M12A

**Figure 1-2 PIM (M12A) and associated PCMCIA card**



- A** Direct connect patient interface module
- B** StressVue Direct Connect PCMCIA card (insert into card reader in PC) (page 1-6)
- C** Direct connect cable

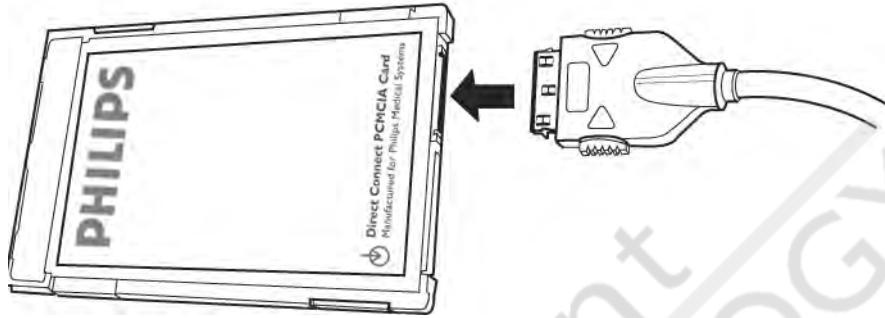
For details about connecting the patient data cable to the patient module, see “Connecting the Patient Data Cable to the Patient Module” on page 1-9.

## Connecting the Direct Connect PIM to the StressVue Computer

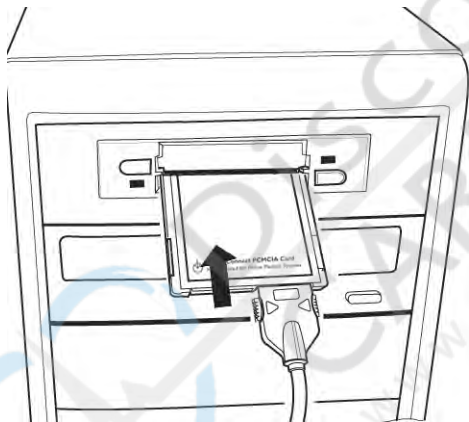
The direct connect PIM connects only to the connector on the associated StressVue Direct Connect PCMCIA card.

### To connect the direct connect PIM to the StressVue computer

- 1 Plug the PIM connector into the connector on the PCMCIA card.



- 2 Insert the PCMCIA card into the card reader slot on the front of the PC and gently push it in.



---

**WARNING** To ensure safety and prevent damage to the system, only connect the patient data cable to the connector on the PCMCIA card.

**Do not connect the patient data cable into any other connector or port on the StressVue computer.**

---

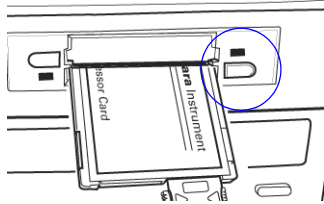
- 3 To minimize stress on the connector to the PCMCIA card, secure the cable to the cart or other configured location by a stress-relief device.

If you are using the StressVue system cart, the stress-relief device is located under the keyboard tray.

**To remove the PCMCIA card from the StressVue computer**

**NOTE** Removing the card is not a routine operation; normally, the card remains in the card reader.

- 1 Push the PC card eject button to the right of the card slot.

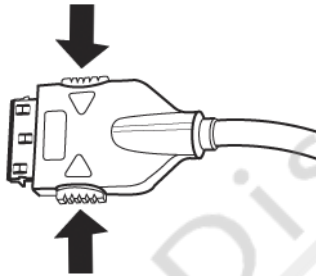


- 2 Gently pull out the card.

**To disconnect the direct connect PIM cable from the PCMCIA card**

**NOTE** It is not necessary nor recommended to regularly disconnect the cable from the card.

- ▶ Gently squeeze the two sides of the PIM cable and pull it out of the connector on the card.

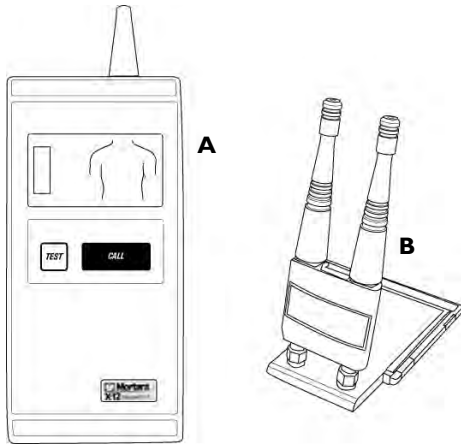


For details on connecting the patient data cable to the patient module, see “Connecting the Patient Data Cable to the Patient Module” on page 1-9.

## About the Ambulatory X-12 Patient Interface Module

The wireless PIM is an option (A03, A04) available in some areas. The wireless PIM includes a transmitter and a PCMCIA card that acts as a receiver.

**Figure 1-3 Ambulatory (wireless) PIM and card**

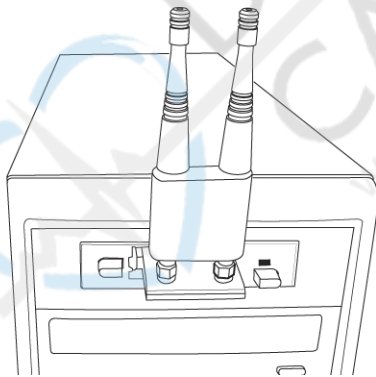


**A** Ambulatory patient interface module

**B** StressVue Direct Connect PCMCIA card with TRPC filter (insert into card reader in PC)

### To insert the wireless card into the PC

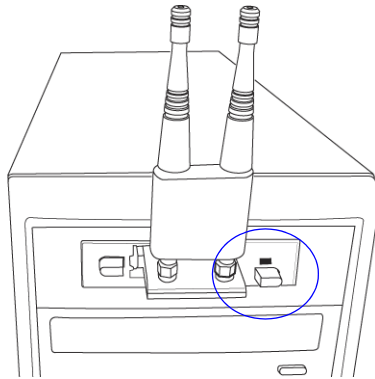
- ▶ Insert the PCMCIA card into the card reader slot on the front of the PC and gently push it in.



### To remove the PCMCIA card from the computer

**NOTE** Removing the card is not a routine operation; normally, the card remains in the card reader.

- 1 Push the card eject button to the right of the card slot.



- 2 Gently pull out the card.

For details on connecting the patient data cable to the patient module, see “Connecting the Patient Data Cable to the Patient Module” on page 1-9.

### Connecting the Patient Data Cable to the Patient Module

#### To attach the patient cable to the patient module

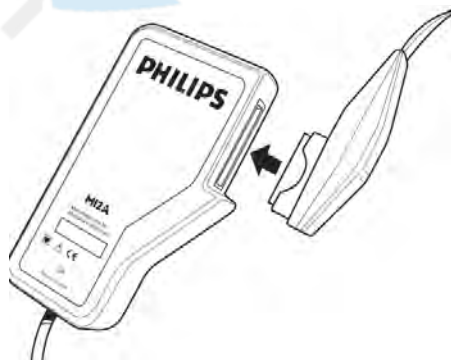
- 1 Ensure that the StressVue PCMCIA ECG Processor card is inserted in the StressVue computer’s card reader. See page 1-6.
- 2 Connect the patient cable to the patient module.

---

#### CAUTION

Be sure the connector on the patient cable is properly aligned with the connector on the patient module, and that you push the connector straight into or pull it *straight* out of the patient module. Inserting the connector at an angle may bend and damage the connector pins on the patient module.

---



#### To detach the patient cable from the patient module

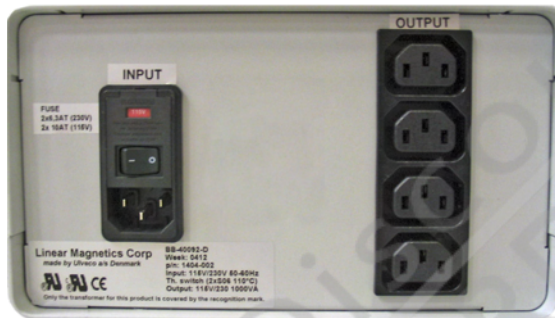
- ▶ Pull the patient cable connector straight out from the patient module. See **Caution** in previous procedure.

## About the Medical Isolation Transformer

- WARNING!**
- Possible explosion hazard. Do not use in the presence of flammable anesthetics.
  - Use of this transformer with equipment other than originally supplied, or surpassing the ratings, may cause damage, fire, or injury.
  - Risk of electrical shock! Do not remove cover. Refer servicing to qualified service personnel. Grounding reliability can only be achieved when the equipment is connected to an equivalent receptacle marked "Hospital Grade."

The isolation transformer provides power to the StressVue system, including the PC, monitor, and printer, as well as the automated blood pressure monitor, if in use. Two models are available: 115V and 220V. For specifications, see Appendix F, "Specifications and Requirements."

**Figure 1-4** Medical isolation transformer (115V pictured)



## About the Printer

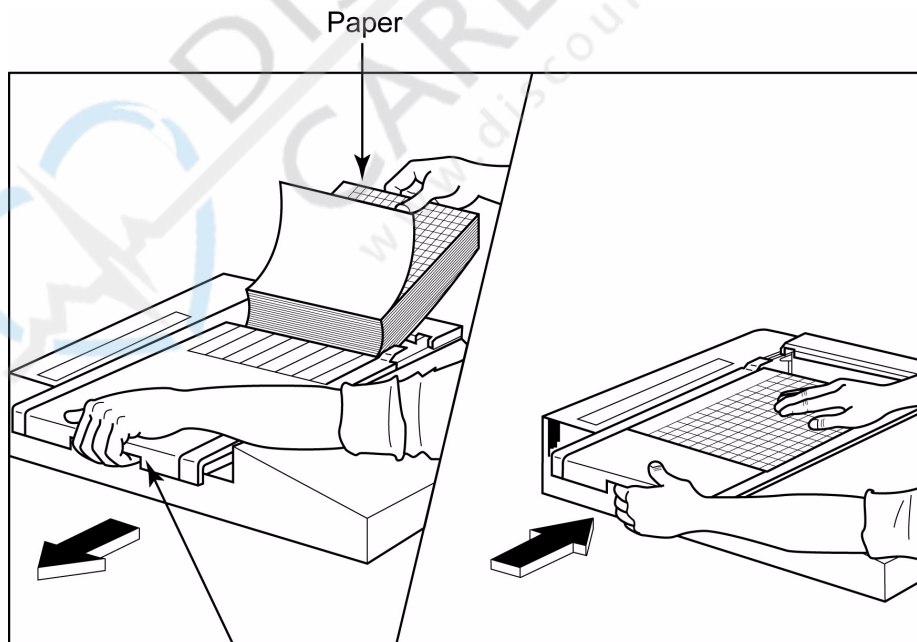
StressVue supports the use of the StressVue thermal printer. The computer-controlled thermal printer uses an eight-dot per millimeter print head to print out ECG tracings and report data. It also supports multiple print formats, controlled from within the application.

The printer operates on line power (connected to the isolation transformer) and is controlled by a local area network (LAN) connection to the stress testing system.

For details about the printer, including setup and configuration, see Appendix D, "Configuring and Using the Printer."

**Figure 1-5 StressVue Thermal Printer****Loading the Thermal Printer Paper****To load the paper**

- 1 Remove the outer packaging from the paper pack.
- 2 Facing the front of the unit, use the release latch on the left side and slide the paper tray cover to the left.



Paper Door Latch

- 3 Place the pack of thermal paper into the paper tray such that the grid side of the paper is up when it is pulled over the paper tray cover. The paper cue mark (a small black rectangle) should be in the lower left corner.
- 4 Manually advance one page of paper beyond the closure point of the writer. Make sure the paper lays on the black roller evenly within the channel of the paper door.
- 5 Slide the writer cover to the right until the cover latches in a locked position. You will hear a sharp click when the door is properly latched.
- 6 Push the form-feed button to align the cue mark and prepare the paper for printing.

## StressVue Basics

The following sections provides a general overview of StressVue:

- “About Stress Testing” on page 1-12  
Provides a brief overview of the purpose of stress testing, protocols, and the functionality the StressVue application offers before, during, and after a test.
- “About the StressVue Exercise Testing Workflow” on page 1-16  
Provides a brief overview of the stress testing process using StressVue, by phase.
- “About the StressVue Application” on page 1-18  
Provides basic information about running StressVue, as well as an overview of the screens and functions within the application, and how to navigate between them.

For detailed information about preparing a patient and conducting a test, see Chapter 2, “The Patient Session.”

## About Stress Testing

Exercise stress testing is a valuable non-invasive diagnostic tests in the clinical evaluation and management of patients with suspected or known cardiovascular disease, particularly coronary artery disease (CAD). The exercise stress test is also a very useful tool when used as a screening procedure.

The treadmill and cycle ergometer are the most commonly used exercise testing devices. Pharmacological studies can be used when the patient is unable to walk or cycle.

## About Profiles and Protocols

Profiles allow individual clinicians to define preferred test settings, including screen configuration, filters to use, and so on. A profile acts as a template for a given clinician or facility; you can, however, override individual settings for a particular test. These overrides apply only to the current session, however. The settings are reset to those specified in the profile at the next patient session.

Many different protocols are used for clinical exercise testing. All protocols include a warm-up period, an uninterrupted exercise period with progressively increasing load, and a recovery period.

StressVue ships with the following standard protocols: Bruce, Modified Bruce, Naughton, Ellestad, Balke, Pharmacological, and Bicycle. For a snapshot of each protocol, see Appendix B, “Protocol Reference.” You can modify these protocols, or add new ones, as described in “Defining and Modifying Protocols” on page 5-7.

## How StressVue Loads Profiles and Protocols

When you define profiles, you can specify a profile as the *Startup profile*. The settings specified in the startup profile are loaded automatically when you start StressVue.

StressVue loads profiles and associated protocols as follows:

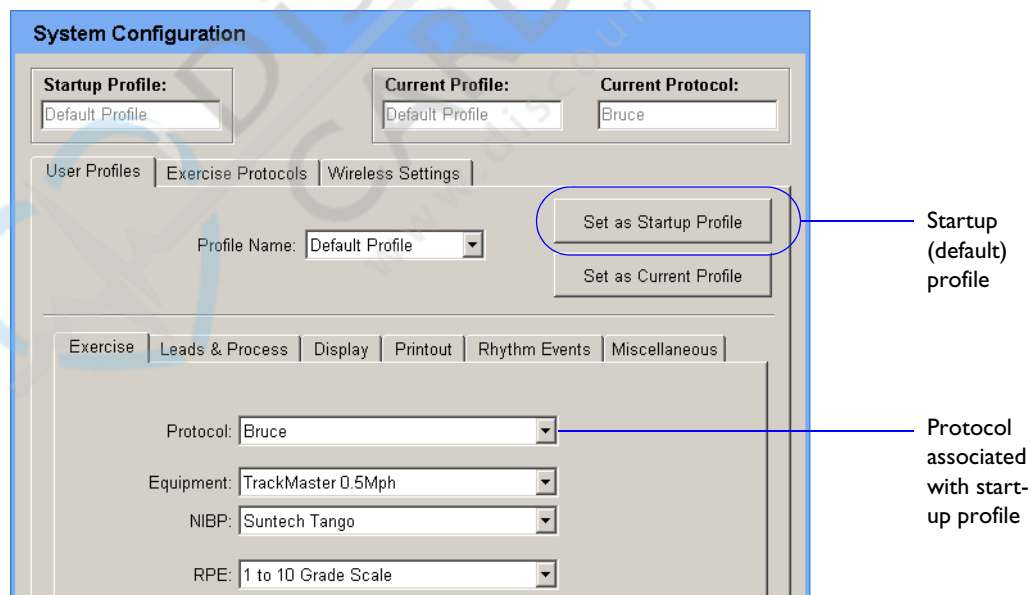
- When you start up StressVue, the application by default loads the profile defined as the *Startup profile* in the Configuration settings. See “Defining and Modifying Profiles” on page 5-2.

In addition, StressVue loads the protocol that is associated with the profile defined as the startup profile.

### NOTE

Note that the startup profile is not necessarily named *Default Profile*; this name is used here for illustrative purposes.

**Figure 1-6 Startup profile and protocol**



- After previously running a test, when you start a new patient session by clicking **New Exam**, StressVue loads the profile and protocol used for the previous test.

You can change the profile and/or protocol to use for a given test. See “Starting a Patient Session” on page 2-9.

In addition, you can change which profile is selected as the startup profile, as well as which protocol is associated with this startup profile. For details, see Chapter 5, “Configuring StressVue.”

## What StressVue Displays

The StressVue application can be configured to display all or some of the following information.

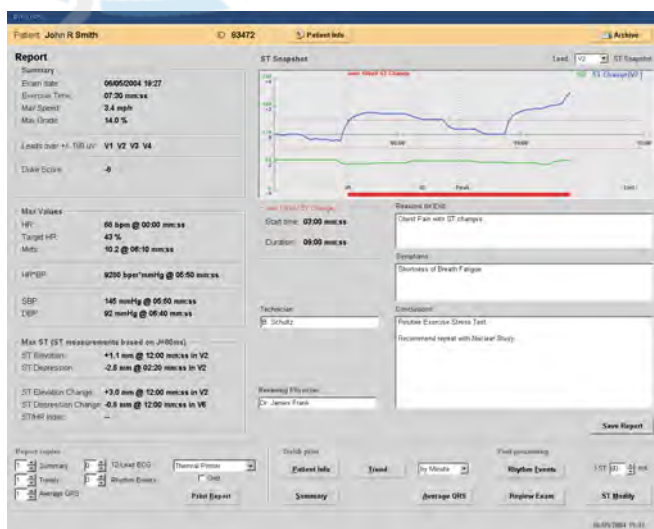
During the test, you can choose from four rhythm display screens:

- 3-lead display.** Three channels consisting of 5 seconds of three user-defined leads.
- 6-lead display.** Six channels consisting of 5 seconds of six user-defined leads.
- 6x2-lead display.** Six split channels consisting of 2.5 seconds each of all 12 leads.
- 12-lead display.** Twelve channels consisting of 5 seconds each of all 12 leads.

Additional parameters displayed during testing include:

- Treadmill speed and grade
- ST level
- Phase and stage
- Patient name
- One average complex for each of the displayed ECG leads superimposed for comparing current data to reference data
- User defined expanded average complex superimposed for comparing current data to reference data
- Beats per minute (bpm)/ % of target heart rate
- Blood pressure
- Stage time
- Total exercise time
- Running trends of heart rate, ST level, and METS

At the end of the Recovery phase, the Report Manager displays a summary page that allows you to define and create the final report. For details, see Chapter 3, “Working with Reports.”



The summary page includes a tabular data page, comprising a stage summary and a minute summary for exercise and recovery. For details, see Chapter 3, "Working with Reports."

**Patient 4 Sample 4**  
04/01/2004 12:49  
3 MM ST DEP

68 yrs Female  
Protocol: BRUCE

**Summary**

Exercise Time: 04:30  
Leads with 100µV ST: I, II, III, aVR, aVF, V1, V3, V4, V5, V6  
PVC's: 0  
Duke Treadmill Score: -6  
FAIR: 9/22

**Max Values**

Speed: 2.5 MPH HR: 93 BPM % Target: 65%  
Grade: 12.0% SBP: 138 mm Hg  
METS: 7.1 DBP: 89 mm Hg  
HR\*BP: 11178  
ST/HR Index: 16.50v/typen in V5 at 06:50

**Max ST**

ST elevation: 2.1 mm in aVR at 05:30  
ST depression: -3.1 mm in II at 05:30

**Max ST Changes**

ST elevation change: 1.6 mm in aVR at 05:30  
ST depression change: -2.5 mm in V5 at 05:30

**Reasons for End**

Significant ST change with symptoms

**Symptoms**

Chest Pain  
Shortness of Breath  
Jaw Pain

**Conclusions**

Strongly positive Stress Test.  
Patient taken to Cardiac Cath Lab for emergent treatment.

Technician: A. Hannibal

St. Mary's Hospital

**Patient 4 Sample 4**  
04/01/2004 12:49

**SUMMARY TABLE**  
ST measurement based on J-6mins

STAGE SUMMARY										ST LEVEL (mm)									
Speed (MPH)	Grade (%)	HR (BPM)	BP (mm Hg)	METS	HR*BP	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6		
START EXE	EXE 00:00			59															
STAGE 1	EXE 03:00	1.7	10.0	81	138/88	4.6	11040	-0.3	-0.8	-0.5	0.5	0.0	-0.7	0.4	0.1	0.0	-0.4	-0.6	-0.6
PEAK EXE	EXE 04:30	2.5	12.0	92		7.1		-1.0	-2.6	-1.6	1.7	0.2	-2.1	1.1	0.0	-1.3	-1.9	-2.6	-2.7
RECOVERY	REC 01:00	0.3	0.0	82		1.2		-1.3	-3.1	-1.9	2.1	0.2	-2.5	1.6	0.1	-1.5	-2.2	-3.1	-2.8
RECOVERY	REC 02:30	0.3	0.0	75		1.2		-1.1	-2.7	-1.6	1.8	0.2	-2.1	1.4	0.2	-1.0	-1.6	-2.4	-2.4
RECOVERY	REC 03:00	0.3	0.0	67		1.2		-1.1	-2.5	-1.4	1.7	0.1	-2.0	1.3	0.1	-0.9	-1.5	-2.2	-2.2
RECOVERY	REC 04:00	0.3	0.0	72		1.2		-0.9	-2.2	-1.3	1.5	0.1	-1.8	1.1	0.0	-1.0	-1.5	-2.1	-2.0
RECOVERY	REC 05:00	0.3	0.0	66		1.2		-0.8	-1.9	-1.1	1.2	0.1	-1.5	0.9	0.0	-0.9	-1.4	-1.9	-1.7
RECOVERY	REC 06:00	0.3	0.0	60		1.2		-0.8	-1.6	-0.9	1.1	0.0	-1.3	0.8	-0.1	-1.0	-1.4	-1.9	-1.6
RECOVERY	REC 07:30	0.3	0.0	62		1.2		-0.8	-1.8	-1.0	1.2	0.0	-1.4	0.9	0.0	-0.8	-1.2	-1.7	-1.6
RECOVERY	REC 08:00	0.3	0.0	63		1.2		-0.8	-1.8	-1.0	1.2	0.1	-1.4	1.0	0.1	-0.7	-1.2	-1.7	-1.6
RECOVERY	REC 09:00	0.3	0.0	65		1.2		-0.7	-1.7	-1.0	1.1	0.1	-1.4	0.9	0.2	-0.5	-1.1	-1.6	-1.5
RECOVERY	REC 10:00	0.3	0.0	68		1.2		-0.7	-1.6	-1.0	1.1	0.1	-1.3	0.9	0.2	-0.4	-1.0	-1.5	-1.4
RECOVERY	REC 11:00	0.3	0.0	64		1.2		-0.6	-1.7	-1.1	1.0	0.2	-1.4	0.8	0.4	-0.1	-0.9	-1.5	-1.4
RECOVERY	REC 12:00	0.3	0.0	67		1.2		-0.6	-1.5	-0.9	0.9	0.1	-1.2	0.8	0.3	-0.1	-0.8	-1.2	-1.2
END REC	REC 12:32	0.3	0.0	63		1.2		-0.5	-1.4	-1.0	0.9	0.2	-1.2	0.7	0.3	-0.1	-0.8	-1.3	-1.2

MINUTE SUMMARY										ST LEVEL (mm)									
Speed (MPH)	Grade (%)	HR (BPM)	BP (mm Hg)	METS	HR*BP	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6		
EXE 00:00				59															
EXE 01:00	1.7	10.0		72															
EXE 02:00	1.7	10.0		78															
EXE 03:00	1.7	10.0		81	138/88	4.6	11040	-0.5	-1.3	-0.9	0.8	0.1	-1.1	0.6	0.0	-0.7	-1.0	-1.4	-1.3
EXE 04:30	2.5	12.0		92		7.1		-0.9	-2.2	-1.4	1.5	0.2	-1.8	0.9	0.0	-1.4	-1.9	-2.5	-2.5
REC 00:30	0.3	0.0		91		1.2		-1.0	-2.6	-1.6	1.7	0.2	-2.1	1.3	0.1	-1.4	-2.0	-2.7	-2.6
REC 01:30	0.3	0.0		78		1.2		-1.2	-2.9	-1.7	1.9	0.2	-2.3	1.5	0.2	-1.1	-1.8	-2.6	-2.5
REC 02:30	0.3	0.0		72		1.2		-1.2	-2.8	-1.6	1.9	0.1	-2.2	1.5	0.2	-1.1	-1.8	-2.6	-2.5
REC 03:30	0.3	0.0		71		1.2		-1.0	-2.2	-1.3	1.5	0.1	-1.8	1.1	0.0	-1.0	-1.5	-2.0	-2.0
REC 04:30	0.3	0.0		67		1.2		-0.9	-2.2	-1.3	1.5	0.1	-1.7	1.0	0.0	-1.1	-1.7	-2.2	-2.0
REC 05:30	0.3	0.0		66		1.2		-0.8	-1.7	-1.0	1.1	0.0	-1.3	0.8	-0.1	-1.0	-1.4	-1.9	-1.6
REC 06:30	0.3	0.0		64		1.2		-0.8	-1.7	-1.0	1.1	0.0	-1.3	0.8	-0.1	-0.9	-1.3	-1.7	-1.6
REC 07:30	0.3	0.0		64		1.2		-0.8	-1.8	-1.0	1.2	0.0	-1.4	0.9	0.0	-0.7	-1.2	-1.7	-1.6

St. Mary's Hospital Philips StressVue V1.0

In addition, you can also print:

- One average complex (at one-minute intervals or at stage intervals) from each of the 12 leads in the exercise and recovery phases
- A trend of the ST level, ST slope, heart rate, blood pressure, double product, workload, and estimated metabolic equivalents (METS)
- Selected 12-lead ECGs

## About the StressVue Exercise Testing Workflow

Exercise testing should be performed by well-trained personnel familiar with normal and abnormal responses during exercise to prevent life-threatening events. During exercise, a cardiologist or specialized practitioner present, in addition to a nurse or medical technician to prepare the patient and assist during the testing.

In general, the stress test goes through the following phases:

- Pre-exercise
- Exercise
- Recovery
- Report

The following sections provide a brief overview of each phase. For detailed information, see Chapter 2, “The Patient Session.”

### About Preparing the Patient

The technician prepares the patient, including:

- Describing the test and what to expect, as well as getting consent form signed
- Preparing the skin and applying electrodes/leads
- Ensuring the electrodes are properly attached (via an impedance meter)
- Demonstrating use of the equipment, if needed

For details, see “Preparing the Patient” on page 2-4.

### About the Pre-Exercise Phase

The Pre-exercise phase includes system preparation for the stress test and initial collection of reference data:

- Starting the StressVue application
- Entering patient information
- Calculating the maximal heart rate
- Determining and setting the appropriate protocol for the patient according to the patient’s clinical status
- Determining and setting lead, gain, filter, and print settings for the test
- Capturing a resting (baseline) ECG and blood pressure; in some cases, also recording a standing and hyperventilation ECGs

The Pre-Exercise “Supine” ECG includes 12-Lead ECG analysis and interpretation using the Mortara Instrument ECG Analysis Program.

For details, see “Beginning the Pre-Exercise Phase” on page 2-17.

## About the Exercise Phase

The Exercise phase comprises the main portion of the test. During the Exercise phase:

- ECGs are printed and blood pressure is taken periodically, depending on preferences.
- The pre-exercise clock is replaced by the total exercise clock and starts counting from 00:00.
- The stage clock appears below the total exercise time clock and starts counting from 00:00. The stage number is also displayed.
- If a treadmill or ergometer is turned on, the workload, as defined in the exercise protocol or manual setting, appears in the upper right corner of the screen. The treadmill or ergometer responds to the displayed settings.
- Pre-exercise reference data is superimposed on the current data for each of the displayed ECG leads and the expanded average Auto Compare complex. As the heart rate increases and/or morphological changes occur, a separation of color occurs. Black represents current data; blue, reference data.

For details, see “Conducting the Exercise Stress Test (Exercise Phase)” on page 2-23.

## About the Recovery Phase

During the Recovery phase:

- The system automatically prints a 12-lead ECG labeled **PEAK EXE**. The 12-lead ECG is printed at this stage transition regardless of system settings. The **PEAK EXE** 12-lead ECG overrides any other ECG or rhythm strip print job in process.
- The total exercise time clock freezes.
- The recovery time clock replaces the stage clock. The recovery stage number is also displayed.
- The Phase button label changes to **End**.
- StressVue advances the treadmill or ergometer to the recovery workloads specified in the protocol.
- The patient is monitored until physiological signs return to baseline (does not continue exercising or cool down).
- You can enter report notes describing why the patient ended the Exercise phase of the test, the patient’s symptoms, and conclusions.

For details, see “Entering the Recovery Phase” on page 2-39.

## About the Report (End) Phase

During the Report phase:

- StressVue freezes the recovery display while the test information is transferred to system storage
- StressVue loads the Report Manager, so you can review the test, and specify the parameters and format of the final report.

For details, see Chapter 3, “Working with Reports.”

## About the StressVue Application

The monitor, together with the keyboard and/or mouse, provide access to all StressVue functions. Use the keyboard and/or the mouse to enter data, access StressVue functions, and view results.

The following sections provide an overview of the main functions in the StressVue application, and the functions available with each mode. For detailed information, see Chapter 2, “The Patient Session.”

## Powering On the Equipment and Running StressVue

---

**CAUTIONS** Before powering on the StressVue computer or attached components:

- Read the “Safety Summary” chapter and the user safety information about StressVue and associated components.
  - Ensure that the PC, printer, monitor, and if in use at your site, automatic blood pressure monitor, are plugged into the medical isolation transformer.
  - Ensure that the medical isolation transformer is plugged into an approved Hospital Grade AC outlet.
  - Do not run any other applications, including screensavers, on the StressVue PC.
- 

For details on connecting the patient interface module (PIM) to the computer, see “PIM (M12A) and associated PCMCIA card” on page 1-5.

### To turn on the StressVue computer

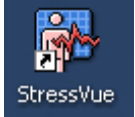
- 1 If not already on, turn on the power on the isolation transformer.  
The isolation transformer provides power to the StressVue system and automated blood pressure monitor, if in use. The transformer remains on between periods of routine system use.
- 2 Power on the computer by pressing the power button, located on the front of the PC.  
The system boots up.
- 3 When prompted, log into the Windows system with your username and password.

## To run StressVue

---

**CAUTION** Do not run any other applications, including screen savers, when performing a stress test.

---



- ▶ Double-click the StressVue application icon on the StressVue computer desktop. The StressVue Startup window appears. For details, see page 1-19. The system is now ready for you to select the appropriate profile and protocol, and start a patient session. All of these steps are covered in detail in Chapter 2, “The Patient Session.”

## About the Application Screens

StressVue presents information in the configurable Main window. You can customize the appearance of the main window by specifying which panes to display and which leads to include. For details, see “StressVue Display Options” on page 2-24.

Buttons in the Main window (and Function keys on the keyboard) provide access to the various functions and configuration settings of the application. For details, see “About the StressVue Main Window” on page 1-21.

## About the StressVue Startup Window

When you first startup the StressVue application, the Startup window appears. It is here that you select the profile and protocol to use for the next patient session, as well as start the Pre-exercise phase. You can also access stored reports, and configure system settings.

### To access the Startup window

- ▶ Launch StressVue by double-clicking the StressVue icon. Once you are in the application, return to the Startup window by clicking **Main Menu** at the top of the screen.

Figure 1-7 StressVue Startup window

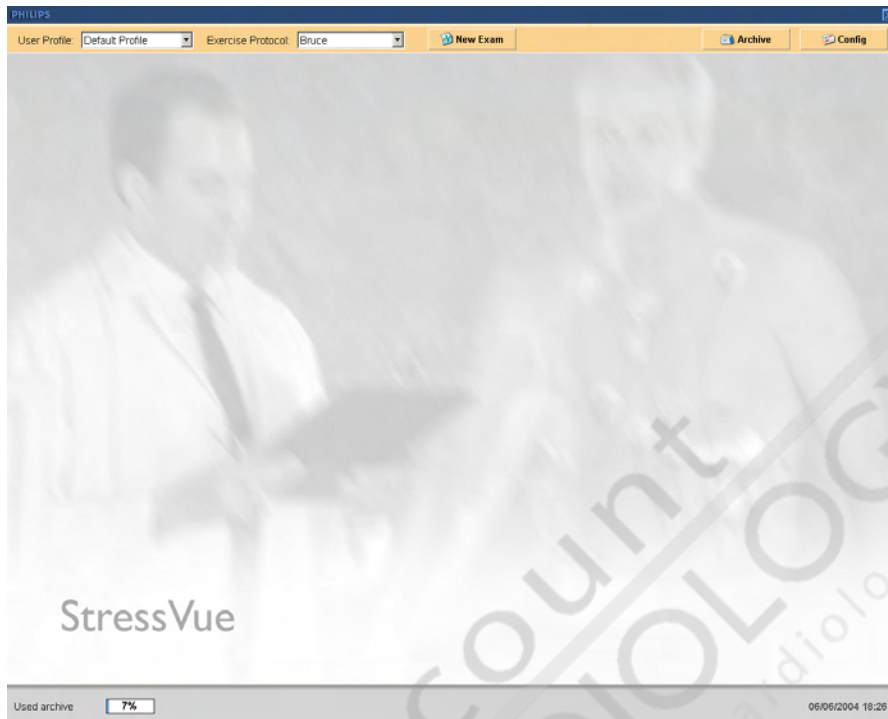


Table 1-1 StressVue Startup window fields

Fields	Description
User Profile	Select the desired profile to use from the dropdown list. You cannot change the selected profile after beginning a new patient session. See “Selecting Profiles and Protocols” on page 2-10.
Exercise Protocol	Select the desired protocol to use from the dropdown list. You cannot change the selected protocol after beginning a new patient session. See “Selecting Profiles and Protocols” on page 2-10.
New Exam button	Click to begin a new patient session. Clicking <b>New Exam</b> displays the Patient Demographics window and begins the Pre-exercise phase of the test. See “Beginning the Pre-Exercise Phase” on page 2-17.
Archive button	Click to search for and display stored reports. See “Viewing a Report” on page 3-17.
Config button	Click to display the Configuration window. This window has multiple tabs, allowing you to define settings for individual profiles. See Chapter 5, “Configuring StressVue.”

## About the StressVue Main Window

The Main window displays all the exercise data and controls. It is configurable so you can see just the data you are interested in, in the format that works best for the test at hand.

### To access the Main window

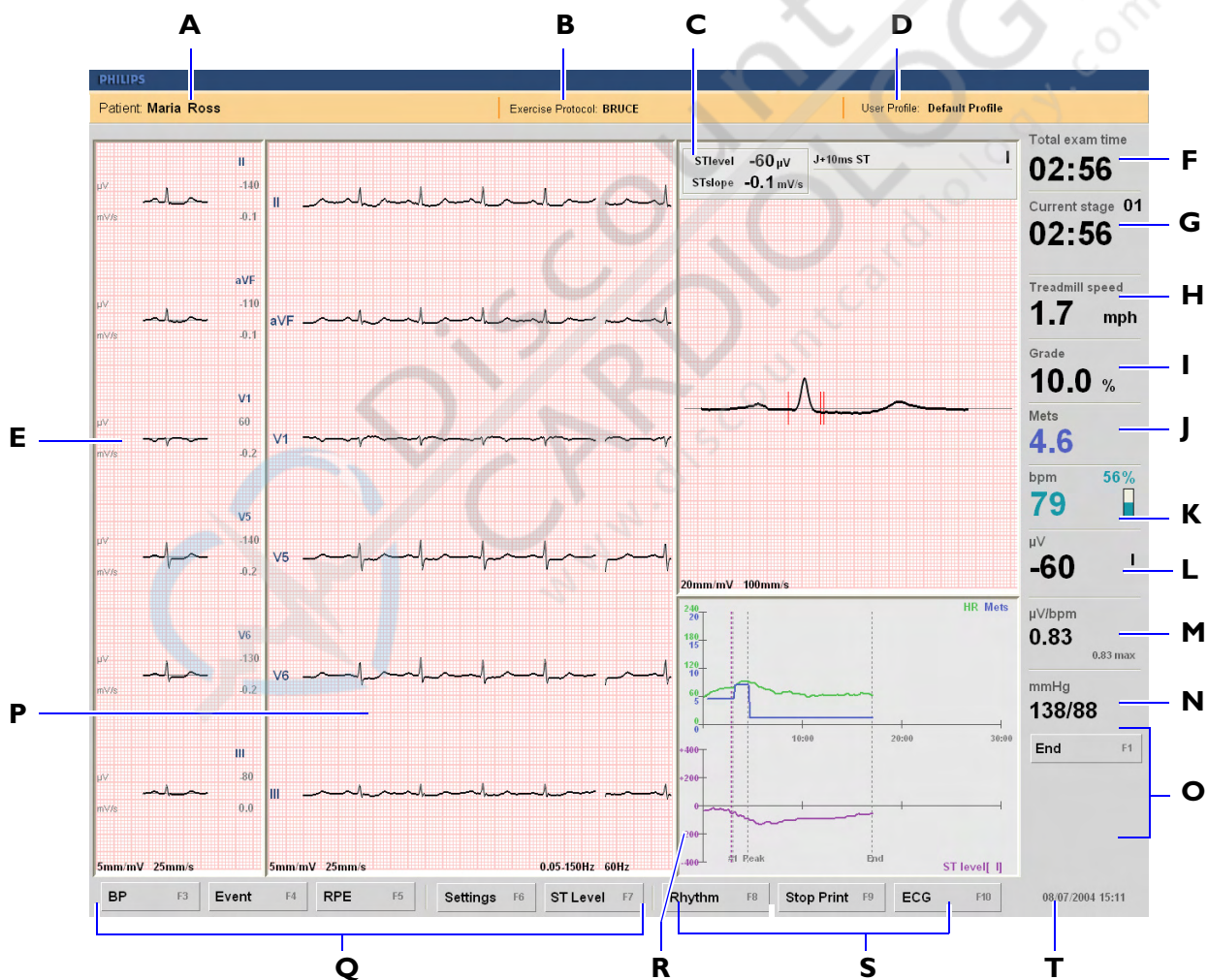
- In the Startup window, click **New Exam**.

The Main window appears.

The *Data panel* on the right side of the window displays measurements, phase and stage information, phase controls, and treadmill (or ergometer) speed and grade information.

The *Command bar* on the bottom of the window provides access to application settings and exercise test controls.

**Figure 1-8 StressVue window**



**Table 1-2 StressVue application window components**

<p><b>A</b> Patient name (page 2-19)</p>	<p><b>B</b> Protocol name (page 2-10) Once selected and the exercise phase is started, you cannot change the protocol for a test.</p>
--	---

**Table 1-2** StressVue application window components (continued)

<p><b>C</b> Zoom ST Lead window (page 2-26)</p>	<p><b>D</b> User profile (page 2-10) Once selected and the exercise phase is started, you cannot change the profile for a test.</p>
<p><b>E</b> Average complex display (page 2-25) The average complex display shows one average complex for each of the displayed ECG leads, with ST level and slope, as well as superimposition of current and reference data.</p>	<p><b>F</b> Total exam (exercise) time (Data panel, page 1-23)</p>
<p><b>G</b> Current stage/stage timer (Data panel, page 1-23)</p>	<p><b>H</b> Treadmill or ergometer speed (Data panel, page 1-23) Displays the current workload settings of the treadmill in miles per hour (mph) or ergometer in watts.</p>
<p><b>I</b> Treadmill grade (Data panel, page 1-23)</p>	<p><b>J</b> METS (Data panel, page 1-23) Displays the estimated metabolic equivalents (METS).</p>
<p><b>K</b> Heart rate and % of target (Data panel, page 1-23)</p>	<p><b>L</b> Current ST level (Data panel, page 1-23)</p>
<p><b>M</b> Calculated ST/HR index value in micro-V/bpm or double product (Data panel, page 1-23)</p>	<p><b>N</b> Last entered or acquired blood pressure reading (Data panel, page 1-23)</p>
<p><b>O</b> Phase button (page 2-1) and treadmill controls (depending on phase) This button displays four different labels during the course of an exercise test: <b>Begin</b>, <b>Start Exe</b>, <b>Recovery</b>, and <b>End</b>. Clicking the button or pressing the F1 function key advances the test to the next phase. Treadmill controls let you turn the treadmill on/off, as well as change speed and grade.</p>	<p><b>P</b> Real-time ECG (page 2-24) Displays the waveforms as they are acquired. The display is configurable to show 3, 6, 12, or 6 x 2 leads.</p>
<p><b>Q</b> Stress test controls (page 1-25) These buttons give you access to test functions, including recording blood pressure, noting an event, and so on.</p>	<p><b>R</b> Running trends (page 2-24) Configurable display of trends.</p>
<p><b>S</b> Manual print controls (page 2-38)</p>	<p><b>T</b> Current date and time</p>

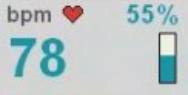
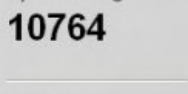
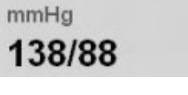

## About the Data Panel

The data panel shows status information about the test and the patient. The top of the panel shows status information about the test and the equipment (Table 1-3). The bottom of the panel shows information about the patient's condition (Table 1-4).

**Table 1-3 Test Status Data panel fields, top portion**

	Field	Description
Total exam time <b>02:52</b>	Total exam time	Shows the total exercise time through all stages of the test protocol. The timer starts at 0.00 in the Pre-exercise phase. When you begin the Exercise phase, the timer resets to 0.00. When the patient stops exercising, the timer freezes until you begin a new test.
Current stage 01 <b>02:52</b>	Current stage <i>and</i> stage timer	The current stage of the test protocol appears in the upper right corner of the stage timer area. In this example, the patient is in stage 1 of the test.  The stage timer shows the time elapsed in the current stage of the exercise protocol. The stage timer resets to 0.00 each time a new stage begins automatically or if you change the workload manually. When the recovery phase starts, the timer also resets to 0.00.
Treadmill speed <input type="text" value="3.4"/> <b>3.4</b> mph	Treadmill speed <i>or</i> Ergometer speed	Shows the current workload of the treadmill in mph (miles per hour) or kph (kilometers per hour).  For an ergometer, shows the reading in Watts.  <b>NOTE:</b> When you print a report with the treadmill off, dashes print in the speed and grade fields. Printing a report with the treadmill on ensures the appropriate values appear on the report.  You can click the up and down arrows to manually control the treadmill. See “Controlling the Treadmill or Ergometer” on page 2-34.
Grade <input type="text" value="14.0"/> <b>14.0</b> %	Grade	Shows the current elevation of the treadmill as a percentage.  <b>NOTE:</b> When you print a report with the treadmill off, dashes print in the speed and grade fields. Printing a report with the treadmill on ensures the appropriate values appear on the report.  See “Controlling the Treadmill or Ergometer” on page 2-34.
Mets <input type="text" value="4.6"/> <b>4.6</b>	Mets	Displays the estimated metabolic equivalent. One METs value is provided per stage as soon as the stage is entered.

Table 1-4 Patient Status Data panel fields, bottom portion

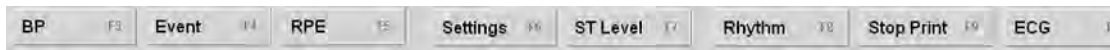
	Field	Description
	Heart rate (bpm) <i>and</i> % of target	<p>Calculates the patient's heart rate, based on two rhythm leads (II and V1), using a sliding average of 16 consecutive R to R intervals.</p> <p>The target heart rate is calculated as 220 minus the patient's age. The graph and numeric percentage show how close the patient is to reaching the target.</p>
	ST level (μV)	Displays the measured ST value in microvolts or mm for the on-screen average complexes.
	Double product (bpm mmHg) <i>or</i> ST/HR index (μV/bpm)	<p>The display depends on whether the profile was configured to show Double product or ST/HR index.</p> <ul style="list-style-type: none"> <li>■ For <b>Double product</b>, StressVue waits for a manual or automatic blood pressure reading, then calculates and displays the value of BP x HR (systolic blood pressure multiplied by the heart rate).</li> <li>■ For <b>ST/HR index</b>, StressVue calculates and displays the value in micro-V/bpm. The index value only appears if StressVue detects an increase in heart rate of more than 10 beats and any ST depression (below 0 mm). Otherwise, dashes are displayed.</li> </ul>
	Blood pressure (mmHg)	<p>Shows the most recent blood pressure reading. When the value is updated, the background turns yellow and a beep sounds. The value remains on the screen for 60 seconds (or 13 seconds into a new stage, whichever comes first). Then the value is cleared and replaced with dashes until a new value is entered.</p> <p>When you use the Tango NIBP cuff, a bar graph tracks the elapsed time of each automatic reading. A typical reading fills 3-4 bars. After 60 seconds, the graph is full and the reading terminates.</p>

## Testing and Acquisition Settings

During a patient session, you can modify several test settings, including acquiring or recording blood pressure readings and events. The buttons in the Command bar at the bottom of the StressVue window provide access to these settings.

For details about these functions, see “Conducting the Exercise Stress Test (Exercise Phase)” on page 2-23.

**Figure 1-9 Command bar**



**Table 1-5 Command bar buttons**

Button	Description	See page...
BP	Click or press F3 to enter a manual blood pressure reading.	2-21 and 2-32
Event	Click or press F4 to display the Event dialog box to generate a 12-lead ECG. StressVue documents the event name on the ECG, keeps the event in memory, and reproduces it in the summary page and minute-by-minute average QRS final reports.	2-32
RPE	Click or press F5 to record the patient’s response when you ask the patient to rate their perceived exertion (RPE)	2-33
Settings	Click or press F6 to change the test settings, including gain, filter, display, and print settings for this patient session.	2-11 and 2-24
ST Level	Click or press F7 to set the Zoom ST Lead and trends display options, as well as manipulating the QRS onset and offset, J-ST time interval, reference average, and dominant complex.	2-28
Rhythm	Click or press F8 to print a rhythm strip.	2-38
Stop Print	Click or press F9 to stop the continuous ECG printout.	2-38
ECG	Click or press F10 to generate a 12-lead ECG printout manually. The ECG configuration is based on the settings for the profile you are using.	2-38

## About the Report Manager

The Report Manager allows you to configure the final report.

### To display the Report Manager

- Click **End** or press F1 to end the Recovery phase and enter the Report phase.

Figure 1-10 Report Manager

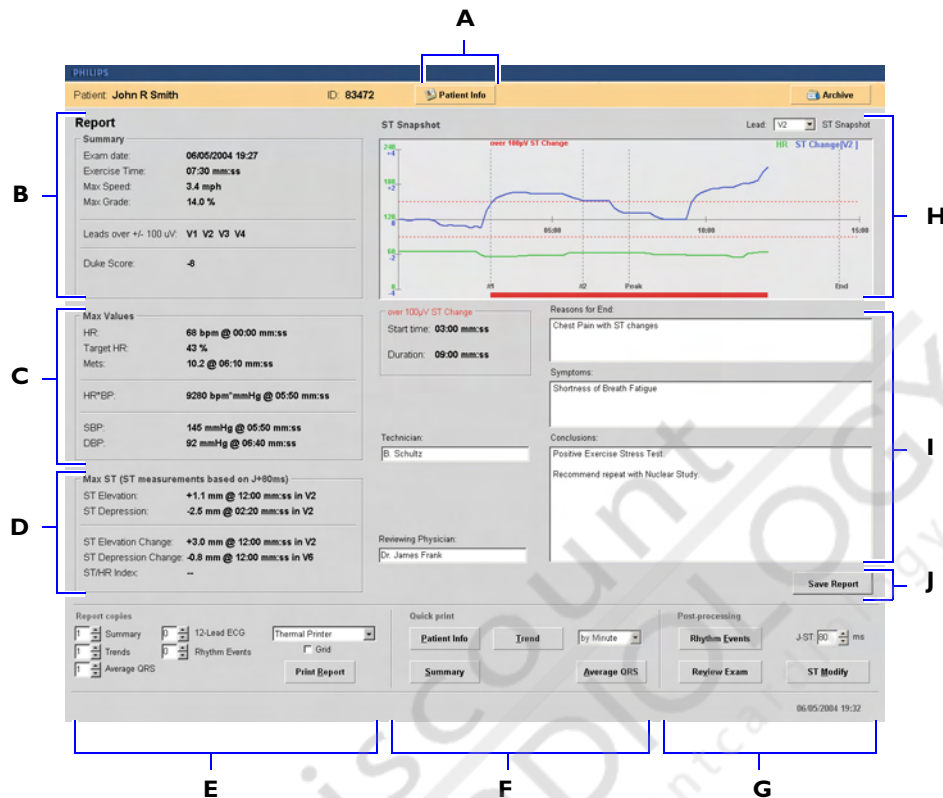


Table 1-6 Report Manager fields

Description	For more information, see.
<b>A Patient info</b> button Click to add or update patient data in the Patient Info window.	“Entering Patient Information” on page 2-19
<b>B Summary</b> Displays basic information about the test.	“Summary Report” on page 3-10
<b>C Max Values</b> Displays maximum values for heart rate, Mets, double product, and blood pressure.	“Summary Report” on page 3-10
<b>D Max ST</b> Displays ST Elevation and ST Depression times and leads, amount of ST change, and ST/HR Index.	“Summary Report” on page 3-10

**Table 1-6 Report Manager fields** (continued)

Description	For more information, see.
<p><b>E Report copies</b> Specify the contents of the final report printout (after you save the report). Select:</p> <ul style="list-style-type: none"> <li>– The number of copies of each individual report to print, if any</li> <li>– What printer to use</li> <li>– Whether to print a grid</li> </ul> <p>Click <b>Print Report</b> to print the final report.</p>	<p>“Printing the Final Report” on page 3-16</p>
<p><b>F Quick print</b> Click to print up one of four individual reports (before or after you save the final report).</p>	<p>“Quick Printing” on page 3-15</p>
<p><b>G Post-processing</b> Click to review or edit test data. You can:</p> <ul style="list-style-type: none"> <li>– Review rhythm events</li> <li>– Review the test</li> <li>– Modify the ST measurement point</li> </ul>	<p>“Reviewing and Editing Test Data” on page 3-4</p>
<p><b>H ST Snapshot</b> Select a lead, then review the heart rate and ST change graph. Below the graph, you can review the start time and duration of any ST Change greater than 100 <math>\mu</math>V.</p>	<p>“Reviewing ST Snapshots” on page 3-5</p>
<p><b>I Report Notes</b> Add or change five fields:</p> <ul style="list-style-type: none"> <li>– Technician</li> <li>– Reviewing Physician</li> <li>– Reasons for End</li> <li>– Symptoms</li> <li>– Conclusions</li> </ul>	<p>“Adding or Updating Report Notes” on page 3-4</p>
<p><b>J Save Report button</b> Click to save the report so it can be printed or exported.</p>	<p>“Saving the Final Report” on page 3-9</p>

## Navigating the Application

Use the mouse and keyboard to navigate the application screens.

Click the left mouse button to activate a command or option. Some commands display a dialog box containing additional options. All dialog boxes time out if no selection is made within 7 seconds. You can also click **Cancel** to exit a dialog box without making changes.

The main commands are also available using the Function keys (F1 through F10) located at the top of the keyboard. Each command in the application also shows the associated Function key. For example, **ECG / F10** in the application indicates that you can print a 12-lead ECG either by clicking the **ECG** button or pressing the F10 key on the keyboard.

## About StressVue Documentation

Philips Medical Systems provides detailed instructional and reference materials to help you get the most out of your StressVue system.

### Available Documentation

The following documentation is available with the StressVue system:

- *StressVue Instructions for Use*  
This guide. A reference that provides detailed information about StressVue functionality, including how to configure the system, as well as run the StressVue application. This guide also includes troubleshooting and maintenance information.  
Specifically, it is intended for stress exercise technicians, as well as system administrators and anyone else authorized to use the system, such as trained clinicians.
- *StressVue Installation and Getting Started Guide*  
Describes how to set up the StressVue hardware and software, and provides an overview of StressVue components and operation.
- *StressVue Tutorial*  
Teaches you to configure and use StressVue.
- *StressVue Administrator Training*  
Explains how to set up, configure, and maintain the StressVue system.
- *Mortara X-12 Operator's Guide*  
Provides information about how to set up and maintain the X-12 wireless transmitter (PIM).

## Conventions Used in this Guide

The documentation and training materials for StressVue use the following typographic conventions.

Item	How Displayed
<b>Menu item</b> <b>Button name</b>	Menu items and button names appear in a bold no-serif font. <i>Example:</i> Click <b>Settings</b> .
Field names and list items	Field names and list items appear in a no-serif font. <i>Example:</i> Select the appropriate format from the Format dropdown list.

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**WARNING** Warning statements describe conditions or actions that may result in injury to the patient.

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**CAUTION** Caution statements describe conditions or actions that may result in damage to equipment or software.

---

**NOTE** Notes provide additional important information about a topic.

## How to Use this Guide

This guide is intended to help you use StressVue. It also provides maintenance and troubleshooting information, as well as product specifications.

This guide is organized as follows:

- Safety Summary.** Lists the warning and caution statements, as well as important notes, that apply to using the StressVue system, the patient modules, and the isolation transformer. Read this chapter before operating any of the equipment.
- 1 Getting Started Using the StressVue Stress Exercise System.** This chapter. Provides an overview of the StressVue system.
- 2 The Patient Session.** Describes all aspects of the patient session, from getting started through the four phases of the test.
- 3 Working with Reports.** Describes how to configure, view, edit, save, and print the final stress test report.
- 4 Maintaining the StressVue System.** Describes how to clean and maintain the system.

- 5**     **Configuring StressVue.** Describes how to configure StressVue to meet your stress testing needs.
  - A**     **Troubleshooting and Contacting the Response Center.** Describes some issues you might encounter and what to do about them. Also describes how to contact the Philips Response Center.
  - B**     **Protocol Reference.** Provides an example of the settings for each of the seven protocols provided with StressVue.
  - C**     **TTL Export for Echo.** Describes the optional TTL output for use with Echo systems.
  - D**     **Configuring and Using the Printer.** Describes how to configure the thermal printer. Also provides specifications and information about the supported LaserJet printer.
  - E**     **Ordering Options and Parts.** Provides a list of parts (including support parts) and options you can order.
  - F**     **Specifications.** Lists the product specifications.
- Glossary.** Defines common terms used with the StressVue system.

## Getting Help Using StressVue

For detailed troubleshooting information, as well as details about contacting the Philips Response Center, see Appendix A, “Troubleshooting and Contacting the Response Center.”

## Ordering Parts and Supplies

For detailed information, see Appendix E, “Ordering Options and Parts.”

## The Patient Session

A patient session is the period of time when the exercise stress test is performed, and waveforms are acquired and processed for a single patient. Patient information is linked with all waveform data acquired during the patient session. The session starts when you begin a new exam and gather pre-exercise data, and lasts through generation of the final report.

This chapter provides the following information:

Overview . . . . .	2-2
Preparing the Patient . . . . .	2-4
Instructing the Patient . . . . .	2-4
Preparing the Skin . . . . .	2-5
Attaching the Electrodes/Lead Wires . . . . .	2-5
Hooking Up the Patient to the StressVue System . . . . .	2-8
Starting a Patient Session . . . . .	2-9
Starting the StressVue Application . . . . .	2-9
Selecting Profiles and Protocols . . . . .	2-10
Specifying Gain, Filter, and Print Settings . . . . .	2-11
Specifying Gain Settings . . . . .	2-13
Specifying Print Settings . . . . .	2-13
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## Overview

The steps in a typical patient session are described below. Refer to the pages listed for detailed information about each step.

**Table 2-1 Overview of the exercise stress test workflow**

<b>Prepare the Patient</b>		
<b>Step</b>	<b>Description</b>	<b>For more information, see...</b>
<b>1</b>	Prepare the patient for the procedure.	“Preparing the Patient” on page 2-4
<b>2</b>	Prepare the electrode sites.	“Preparing the Skin” on page 2-5
<b>3</b>	Attach the lead wires and electrodes.	“Attaching the Electrodes/Lead Wires” on page 2-5
<b>4</b>	Connect the patient module to the patient, using the patient data cable, and to the StressVue system.	“Hooking Up the Patient to the StressVue System” on page 2-8
<b>Configure the System, including Selecting Profile and Protocol</b>		
<b>Step</b>	<b>Description</b>	<b>For more information, see...</b>
<b>1</b>	Launch StressVue.	“Starting the StressVue Application” on page 2-9
<b>2</b>	Select a profile and protocol or use the default settings.	“Selecting Profiles and Protocols” on page 2-10

**Table 2-1 Overview of the exercise stress test workflow** (continued)

<b>Configure the System, including Selecting Profile and Protocol</b> (continued)		
<b>3</b>	Set display and print options. You can also change these options once the test is in progress.	“Specifying Gain, Filter, and Print Settings” on page 2-11
<b>4</b>	Click <b>New Exam</b> to start a new session.	“Starting a New Test” on page 2-14
<b>Begin the Pre-exercise Phase and Enter Patient Information</b>		
<b>Step</b>	<b>Description</b>	<b>For more information, see...</b>
<b>1</b>	In the StressVue window, click <b>Begin</b> or press F1.	“Starting a New Test” on page 2-14
<b>2</b>	Enter patient information.	“Entering Patient Information” on page 2-19
<b>Check the Signal Quality and Acquire Baseline ECG</b>		
<b>Step</b>	<b>Description</b>	<b>For more information, see...</b>
<b>1</b>	When the patient is connected to the StressVue system, check the signal quality.  ECG waveforms are displayed on the screen. Faulty connections appear as square waves, and are listed by name at the top of the screen.	“Checking Signal Quality” on page 2-15
<b>2</b>	If needed, acquire a baseline ECG.	“Acquiring a Resting ECG” on page 2-20
<b>3</b>	Instruct the patient in equipment use.	“Instructing the Patient in Treadmill Use” on page 2-22
<b>Enter the Exercise Phase and Conduct the Test</b>		
<b>Step</b>	<b>Description</b>	<b>For more information, see...</b>
<b>1</b>	In the StressVue window, click <b>Start Exe</b> or press F1.	“Conducting the Exercise Stress Test (Exercise Phase)” on page 2-23
<b>2</b>	Do any of the following:	
	<ul style="list-style-type: none"> <li>■ Record blood pressure</li> </ul>	“Recording Blood Pressure” on page 2-32
	<ul style="list-style-type: none"> <li>■ Record an event</li> </ul>	“Recording an Event” on page 2-32
	<ul style="list-style-type: none"> <li>■ Record RPE</li> </ul>	“Recording RPE” on page 2-33
	<ul style="list-style-type: none"> <li>■ Manually control the treadmill</li> </ul>	“Controlling the Treadmill or Ergometer” on page 2-34
	<ul style="list-style-type: none"> <li>■ Print an ECG and/or continuous rhythm strip</li> </ul>	“Printing an ECG” on page 2-38

**Table 2-1 Overview of the exercise stress test workflow** (continued)

Enter the Exercise Phase and Conduct the Test (continued)		
	Do any of the following (continued)	
	<ul style="list-style-type: none"> <li>■ Change print, filter, and gain settings</li> </ul>	“Specifying Gain, Filter, and Print Settings” on page 2-11
	<ul style="list-style-type: none"> <li>■ Change display options, including leads to display, lead to highlight, and measurements</li> </ul>	“StressVue Display Options” on page 2-24
Enter the Recovery Phase		
Step	Description	For more information, see...
▶	In the StressVue window, click <b>Recovery</b> or press F1.	“Entering the Recovery Phase” on page 2-39
Review the Test and Generate the Final Report		
Step	Description	For more information, see...
1	In the StressVue window, click <b>End</b> or press F1.	“Ending the Patient Session” on page 2-41
2	Configure and review the final report.	Chapter 3, “Working with Reports”
End the Patient Session		
Step	Description	For more information, see...
▶	Click <b>New Exam</b> to begin a new patient session.	“Starting a Patient Session” on page 2-9

## Preparing the Patient

Good ECG technique is very important to achieve the best quality results.

- TIP** The leads are attached to the patient cable, which connects to the patient module (the transmitter) that the patient wears during the exercise test. If your facility has multiple patient cables, you can streamline the testing process by prepping multiple patients before the actual test. Once it is each patient’s time for the test, you can simply plug the patient cable into the patient module and begin the test.

## Instructing the Patient

Before attaching the electrodes, greet the patient and explain the procedure. Explaining the procedure decreases anxiety and informs the patient about what to expect.

- Privacy is important to relaxation. When possible, prepare the patient in a quiet room or area where others cannot see the patient.
- Reassure the patient that the procedure is painless.
- Make sure the patient is comfortable. The patient’s arms and hands must be relaxed.

The more relaxed the patient, the less the ECG will be affected by noise.

## Preparing the Skin

Thorough skin preparation is very important. The skin is a poor conductor of electricity and frequently creates artifact that distorts the ECG signal. By performing methodical skin preparation, you greatly reduce the potential for myographic noise and baseline wander, ensuring high-quality printouts and displayed data. There is a natural resistance on the skin surface due to dry, dead epidermal cells, oils, and dirt.

### To prepare the skin

- 1 Shave hair from electrode sites, if necessary. Excessive hair prevents a good connection.
- 2 Use an abrading pad to lightly scratch an “X” pattern into the skin, taking care to avoid excessive abrading.
- 3 Wash the area thoroughly with soap and water.
- 4 Dry the skin vigorously with a gauze pad to increase capillary blood flow to the tissues and to remove the dead, dry skin cells and oil.

## Attaching the Electrodes/Lead Wires

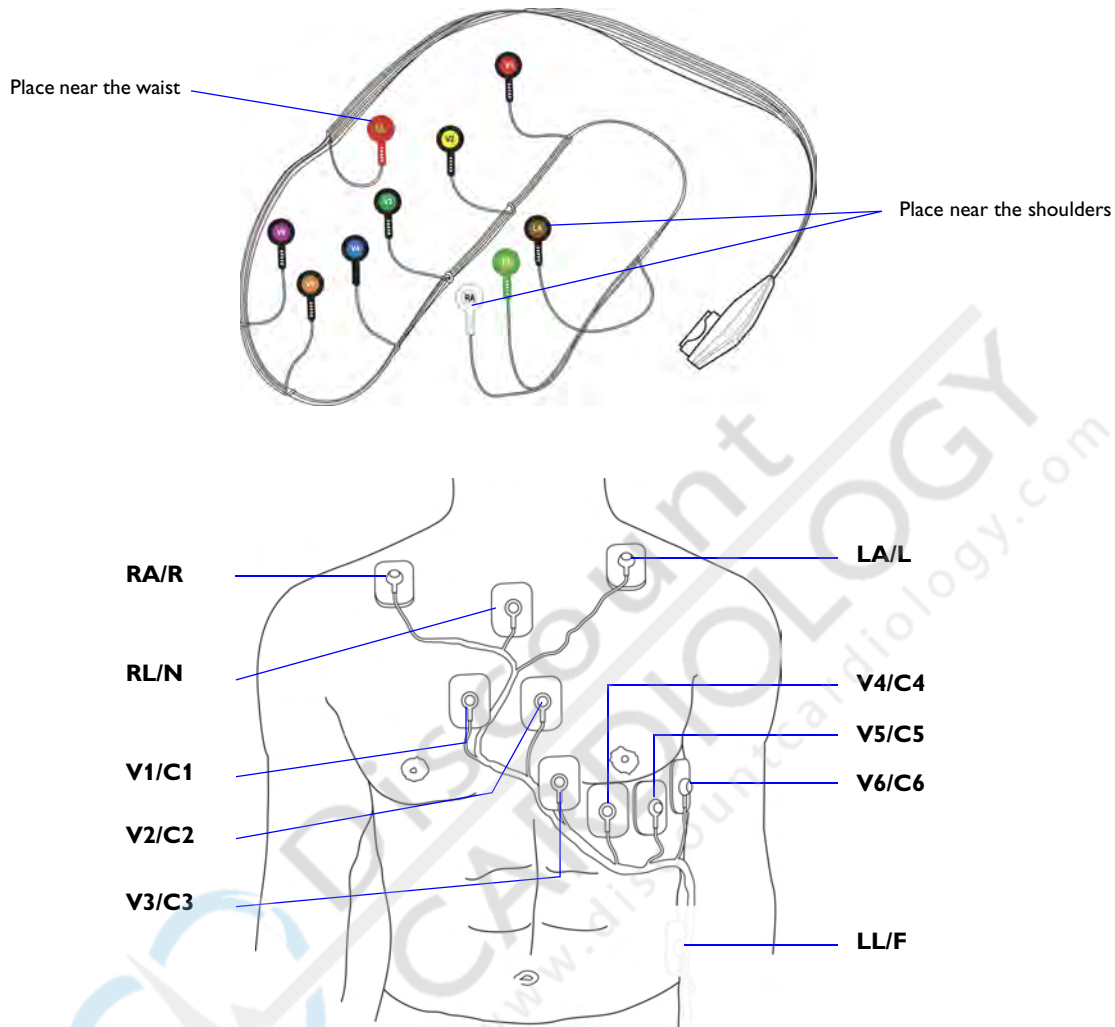
You attach the electrodes to the lead wires on the patient cable before attaching them to the patient. The patented LeadForm patient cable, available in standard and large sizes, is lightweight and conforms to the patient’s torso. This further enhances the patient’s comfort and freedom during testing. The absence of heavy wires reduces the amount of artifact.

When the patient cable is properly draped over the right shoulder of the patient, the order in which to connect the wires to the electrodes is easily apparent, and is described in Table 2-2 on page 2-7.

### To attach the electrodes to the patient

- 1 Firmly attach each lead wire to an electrode.
- 2 Drape the patient cable over the right shoulder of the patient, with the connector on the bottom end and the RA and LA leads at the shoulder.

**Figure 2-1 Patient cable and 12-Lead electrode placement (AAMI/IEC)**



**3** Place the gel area of the electrode over the center of the prepared area, using the positioning described in Table 2-2, below, and illustrated on the previous page; then press the adhesive ring into place.

- Avoid pressing the center of the gel area; this might hinder conduction.
- Place the electrodes on flat, fleshy parts of the arms and legs. See limb lead placement notes below.
- For female patients, place the precordial electrodes on top of the breast (not underneath the breast tissue).

Lead placement is similar to standard 12-Lead ECG placement; however, limb leads are modified, as follows:

- Right Arm and Left Arm leads should be placed close to the shoulders on the clavicle bone, away from muscular areas to avoid muscle interference.
- The Right Leg lead is typically placed on the sternum midway between the arm leads and V1 and V2 leads.

- The Left Leg lead should be placed on a rib in the lower left area of the patient's chest (avoiding flabby areas and the belt).

**4** Ensure the electrodes are firmly attached.

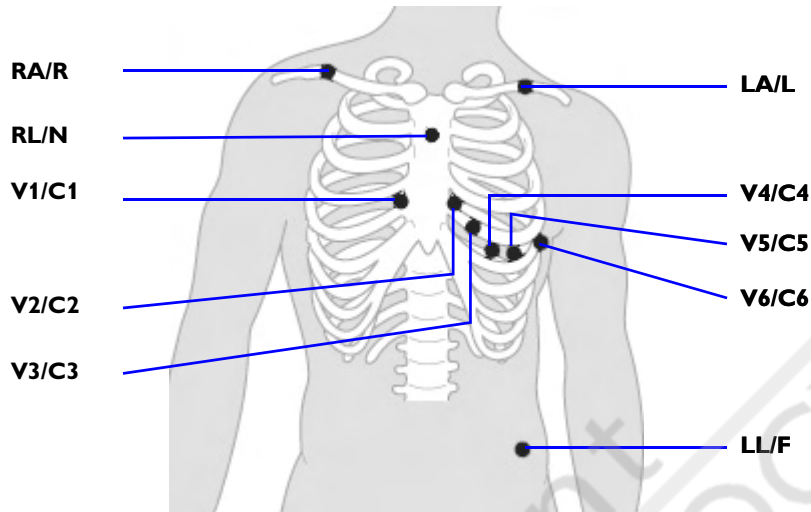
A good test for firm electrode contact is to try to move it. If it moves easily, the electrode connection is too loose. Do not allow the electrodes to move in any way.

Review the following lead wire labeling and electrode placement information to ensure a quality ECG.

**Table 2-2 Leads and positioning**

AAMI Lead	IEC Lead	Electrode Position
 V1	 C1	Right side of the sternum in the 4th intercostal space
 V2	 C2	Left side of the sternum in the 4th intercostal space
 V3	 C3	Midway between V2 and V4
 V4	 C4	Left midclavicular line in the 5th intercostal space
 V5	 C5	Between V4 and V6
 V6	 C6	5th intercostal space, left midaxillary
 LA	 L	Place the limb electrodes for the arm directly on the clavicle bones (away from major muscles)
 RA	 R	
 LL	 F	Below V6 on the ribcage
 RL	 N	On the sternum, midway between the clavicle and the 4th intercostal space

**Figure 2-2 12-Lead electrode placement, internal view (AAMI/IEC)**



See Table 2-1 on page 2-6 for an illustration of the patient cable and leads/electrodes attached to a patient.

## Hooking Up the Patient to the StressVue System

When it is time to conduct the test, attach the patient cable to the patient module. The lead wires are permanently attached to the patient cable. The patient module is connected, via the patient cable, to the StressVue Direct Connect PCMCIA card. For details, see “Connecting the Direct Connect PIM to the StressVue Computer” on page 1-6.

If available in your area, you can purchase the X-12 Ambulatory (wireless) Transmitter and Receiver (options A03 and A04). For details, see Appendix E, “Ordering Options and Parts.”

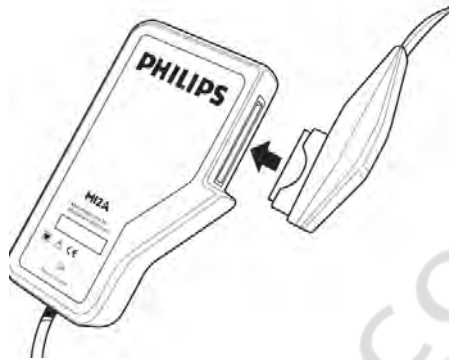
**NOTE** If you are using the X-12 Ambulatory Transmitter/Receiver, refer to the *Mortara X-12 Operator’s Guide* for details on its preparation, configuration, and use.

**To attach the patient cable to the direct connect patient module**

- 1 Ensure that the StressVue PCMCIA ECG Processor card is inserted in the StressVue computer's card reader. See page 1-6.
- 2 Connect the patient cable to the patient module.

**CAUTION**

Be sure the connector on the patient cable is properly aligned with the connector on the patient module, and that you push the connector straight into or pull it *straight* out of the patient module. Inserting the connector at an angle may bend and damage the connector pins on the patient module.

**To detach the patient cable from the patient module**

- ▶ Pull the patient cable connector straight out from the patient module. See **Caution** in previous procedure.

## Starting a Patient Session

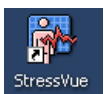
For each new session, you select the appropriate profile and protocol for the test and enter patient information.

- NOTE** Before proceeding, ensure the patient module is connected to the patient and to the StressVue system. See “Hooking Up the Patient to the StressVue System” on page 2-8.

## Starting the StressVue Application

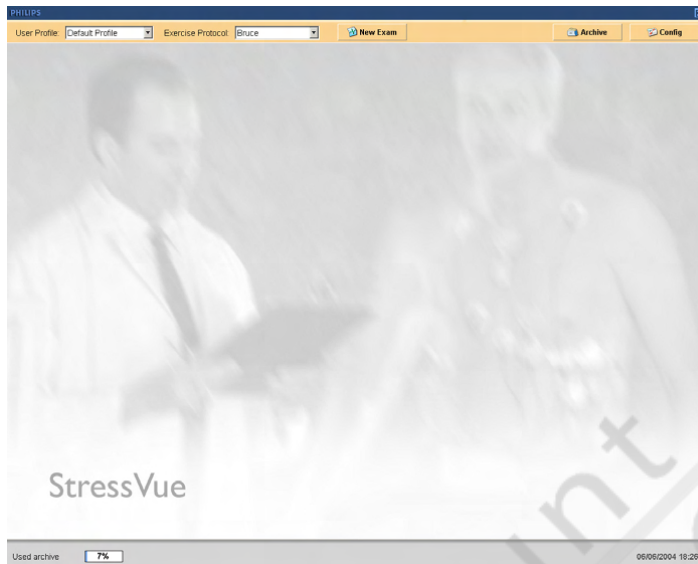
**To run StressVue****CAUTION**

Do not run any other applications, including screen savers, when performing a stress test. Once the test has begun, the StressVue application does not allow you to access other system functions.



- ▶ Double-click the StressVue application icon on the StressVue computer desktop. The StressVue Startup window appears. For details about the contents of this window, see “About the StressVue Startup Window” on page 1-19.

Figure 2-3 StressVue Startup window



You are now ready to specify test options, including the profile and protocol to use.

## Selecting Profiles and Protocols

Profiles allow individual clinicians to define preferred test settings, including the protocol to use, screen configuration, filters to use, and so on. A profile acts as a template for a given clinician or facility; you can, however, override individual settings for a particular test. For more details, see “About Profiles and Protocols” on page 1-12.

### To select a profile

- ▶ Click the arrow in the User Profile field and select the desired profile for the test. The settings associated with the selected profile are loaded into StressVue.

### NOTES

- If the selected profile is defined as the Startup profile, the *Exercise Protocol* field displays the protocol associated with the profile. To use a different protocol, select the desired entry from the *Exercise Protocol* dropdown list.
- After you begin a test (by clicking **Begin** to enter the exercise phase), you must abort the test and start over to change the profile or protocol.

### To change the selected profile after starting a patient session

- 1 Click **Config** (or press F7) to open the System Configuration window.
- 2 Select the desired profile, then click **Set as Current Profile**.
- 3 Click **Done** to close the window.

You can also change which profile is selected as the startup profile, as well as define additional custom profiles. See “Defining and Modifying Profiles” on page 5-2.

**To select a protocol**

- ▶ Click the arrow in the Exercise Protocol field and select the desired protocol for the test.

**NOTE** After you begin a test (by clicking **Begin**), you must abort the test and start over to change the profile or protocol.

The phases and stage settings associated with the selected protocol are loaded into StressVue.

**To change the selected protocol after starting a patient session**

- 1 Click **Config** (or press F7) to open the System Configuration window.
- 2 Click the Exercise Protocols tab.
- 3 Select the desired entry in the Protocol Name drop down list, then click **Set as Current Protocol**.
- 4 Click **Done** to close the window.

You can also change which protocol is associated with the startup profile, as well as define additional custom protocols. See “Defining and Modifying Protocols” on page 5-7.

You can now specify additional settings, if needed. See “Specifying Gain, Filter, and Print Settings,” next. If the selected profile already specifies all of the desired print, filter, gain, and display settings, you can proceed directly to starting the test and entering patient information. See “Beginning the Pre-Exercise Phase” on page 2-17.

**Specifying Gain, Filter, and Print Settings**

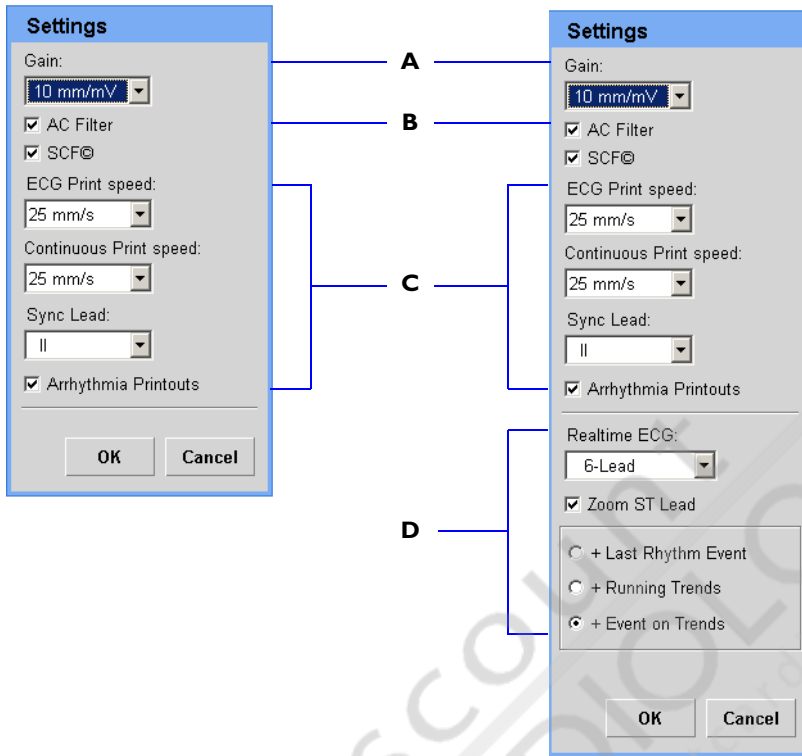
You can specify miscellaneous display, lead, and print settings before beginning a new test session, during the Pre-exercise phase, and/or during the Exercise phase of a test. The options available are different, however, depending on the currently active phase.

**Pre-exercise phase options.** Paper Speed, Gain, AC Filter, Source Consistency Filter, Sync Lead, and Arrhythmia reports.

**Exercise phase options.** Paper Speed, Gain, AC Filter, Source Consistency Filter, Sync Lead, Arrhythmia reports, real-time ECG display format, whether to display an enlarged ST Lead, and Running Trends display.

While you can specify settings for individual test sessions, you can also associate a default group of settings with a profile. Then, when you select a given profile for use in a test session, the default settings associated with that profile are applied. For details, see Chapter 5, “Configuring StressVue.”

**Figure 2-4 Settings options (Pre-exercise phase (left), Exercise phase (right))**



**A** Gain settings (page 2-13)

**B** Filter settings (page 2-15)

**C** Print settings (page 2-13) and Sync lead (page 2-14)

**D** Display settings (page 2-24)

The Sync lead setting is used for the TTL output option (page C-1).

This option is available only during the Exercise phase of a test.

**To change display, print, and lead settings**

- 1 Click **Settings** at the bottom of the screen or press F6.  
The Settings dialog box appears.
- 2 Choose the desired settings and click **OK**.

**NOTE** Like all other dialog boxes, the Settings dialog box automatically closes after 10 seconds of inactivity.

## Specifying Gain Settings

You can choose the amount of gain or amplitude for the on-screen ECG display, 12 lead printout, and continuous rhythm strip.

**NOTE** The expanded average complex is printed at 100mm/s and 40mm/mV regardless of the gain selected.

### To set the gain amount

- 1 Display the Settings dialog box by clicking **Settings** or pressing F6 (page 2-12).
- 2 Click the arrow next to the **Gain** field and choose the desired value.  
Options are, in mm/mV: 2.5, 5, 10, 20, 40
- 3 Click **OK** or press Enter to save your changes and close the dialog box.

## Specifying Print Settings

You can set various print settings, including print speed for ECG reports, print speed for continuous rhythm reports, and whether to print a report when the system detects an arrhythmia.

### To set the ECG report print speed

- 1 Display the Settings dialog box by clicking **Settings** or pressing F6 (page 2-12).
- 2 Click the arrow next to the **ECG Print speed** field and choose the desired value.  
Options are, in mm/s: 25, 50
- 3 Click **OK** or press Enter to save your changes and close the dialog box.

### To set the continuous rhythm print speed

- 1 Display the Settings dialog box by clicking **Settings** or pressing F6 (page 2-12).
- 2 Click the arrow next to the **Continuous Print speed** field and choose the desired value.  
Options are, in mm/s: 5, 10, 25, 50
- 3 Click **OK** or press Enter to save your changes and close the dialog box.

### To print a report for each arrhythmia

- 1 Display the Settings dialog box by clicking **Settings** or pressing F6 (page 2-12).
- 2 Select the **Arrhythmia Printouts** check box.  
You can change the setting at any time during a stress test.
- 3 Click **OK** or press Enter to save your changes and close the dialog box.

## Specifying the Sync Lead (TTL Output Option)

If you have the TTL Output option, you can select the ECG lead used for TTL output. By default, StressVue uses lead II. When using this option, select the lead with the greatest amplitude on a patient-by-patient basis.

For more details about this option, see Appendix C, “TTL Export for Echo.”

### To specify the sync lead

- 1 Display the Settings dialog box by clicking **Settings** or pressing F6.
- 2 Click the arrow next to the Sync Lead field and choose the desired lead.
- 3 Click **OK** or press Enter to save your changes and close the dialog box.

You can now begin the test, check signal quality, and enter patient information.

## Starting a New Test

### To start the test

- ▶ Click **New Exam** or press Enter to start a new test session.

The Main window appears, displaying the waveforms as they are acquired from the patient.



By default, the application displays the real-time ECG waveforms in the format specified in the selected profile. To change the real-time ECG display, see page 2-25.

Note that the selected profile and protocol are listed at the top of the window as read-only text. For details, see page 2-10.

You can now check the signal quality for artifact or baseline drift, and then proceed with entering patient information.

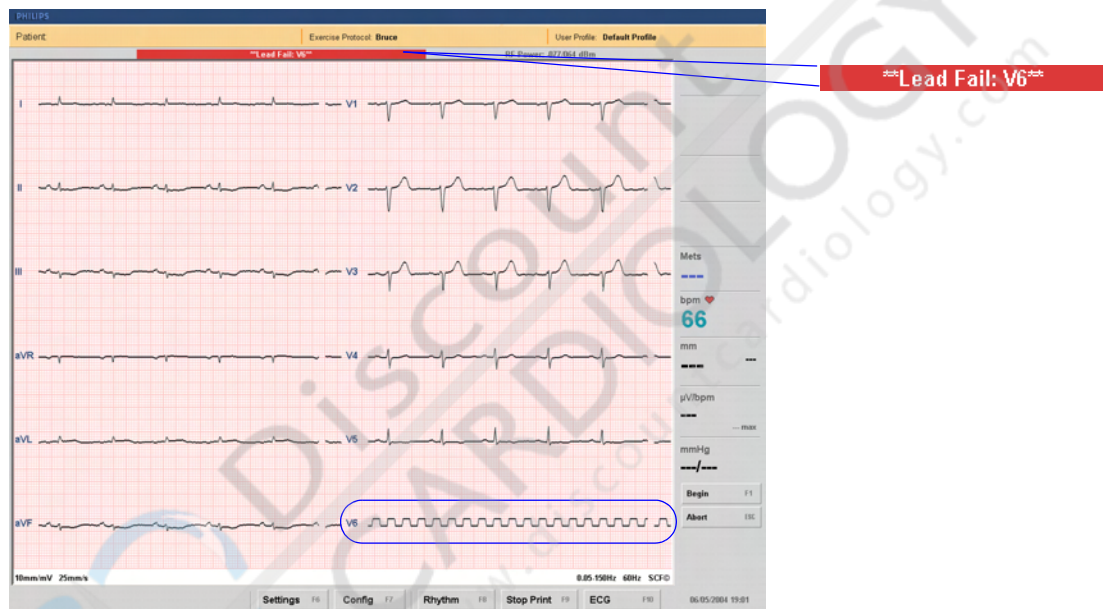
## Checking Signal Quality

StressVue has a built-in feature that provides instant signal quality feedback. If a lead fails, square waves appear for that lead on the screen, and the faulty lead name appears in red letters in the upper-middle border of the screen.

The lead failure message appears when the DC offset is out of the normal operating range of +300 mV to -300 mV.

In instances of simultaneous multiple lead fail conditions, the system gives display priority to the limb leads, followed by leads V1 through V6. Connecting the electrodes to the patient automatically turns off the lead failure warning.

**Figure 2-5** Faulty lead display example (V6)



If the screen shows one or more faulty lead connections, re-prep the patient (page 2-5) and replace the electrodes (page 2-5), as necessary, until the display shows satisfactory tracings.

If needed, you can enable filters, as described next.

## Using Filters

Filters may be used for ECGs that would otherwise be unreadable due to excessive amounts of noise and artifact. You can enable or disable filters at any time during the patient session.

StressVue supports two filters:

- Source consistency filter (SCF)
- AC filter (page 2-16)

## The Source Consistency Filter (SCF)

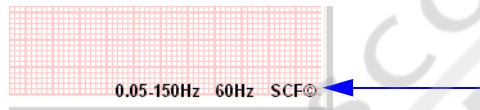
The Source Consistency Filter (SCF), patented by Mortara Instrument, is an exclusive feature used for reducing noise associated with stress testing. Using the morphology learned during the Pre-exercise phase or during a Relearn operation (page 2-30), the SCF distinguishes between noise and the actual signal in each lead. This filtering reduces muscle tremor noise, low frequency and high-frequency noise, and baseline artifact, while preserving diagnostic-quality waveforms.

The default state of the filter (enabled or disabled) is determined by the selected profile. You can change the setting at any time during a stress test.

### To enable/disable the SCF

- 1 Display the Settings dialog box by clicking **Settings** or pressing F6 (page 2-12).
- 2 To enable the filter, select the SCF<sup>®</sup> check box.  
To disable the filter, clear the check box.
- 3 Click **OK** or press Enter to save your changes and close the dialog box.

When the filter is on, the symbol SCF<sup>®</sup> appears in the lower right border of the real-time ECG part of the window.



## The AC Filter

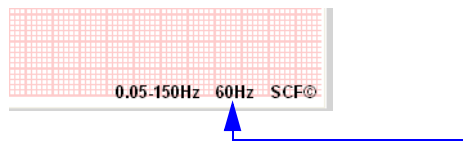
The AC filter removes line frequency noise by removing frequencies in a narrow band around 60 Hz (domestic) or 50 Hz (international).

The default state of the filter (enabled or disabled) is determined by the selected profile. You can change the setting at any time during a stress test.

### To enable/disable the AC filter

- 1 Display the Settings dialog box by clicking **Settings** or pressing F6 (page 2-12).
- 2 To enable the filter, select the AC Filter check box.  
To disable the filter, clear the check box.
- 3 Click **OK** or press Enter to save your changes and close the dialog box.

When the filter is on, the bottom right corner of the real-time ECG part of the window displays 50Hz or 60Hz.



You are now ready to begin the Pre-exercise phase and enter patient information, as well as acquire baseline data.

## Beginning the Pre-Exercise Phase

When the tracings are satisfactory and you have specified the desired settings, you can start the Pre-exercise phase of the test.

During this phase:

- You enter patient data.
- You acquire a resting ECG, and record baseline blood pressure.
 

The Pre-Exercise “Supine” ECG includes 12-Lead ECG analysis and interpretation using the Mortara Instrument ECG Analysis Program.
- The pre-exercise clock starts counting from 00:00. The duration of the Pre-exercise phase is determined by the selected protocol.
- The Learn process begins.
 

During this process, StressVue acquires ECG data to develop the patient’s cardiac template, and uses this template for arrhythmia detection.
- The Phase button label changes to **Start Exe**.

### To start the Pre-exercise phase of the test

- ▶ Click **Begin** or press F1.

The exercise profile screen appears in the background; the Patient Information window also appears (see Figure 2-7 on page 2-18). In addition, the Phase button label changes to **Start Exe** (page 2-23), and the pre-exercise clock and Learn process begin.

**Figure 2-6 Pre-Exercise phase screen**



In the example, the Patient Information window below has already been filled in with data; for a new test, it is empty.

**Figure 2-7 Patient Information window**

**Table 2-3 Patient Information window fields**

Field Name	Description
First name	Patient's first name. May contain up to 40 alphanumeric characters.
Middle name	Patient's middle name. May contain up to 40 alphanumeric characters.
Last name	Patient's last name. May contain up to 40 alphanumeric characters.
ID	Patient ID. May contain up to 40 alphanumeric characters.
Second ID	Secondary patient ID field. May contain up to 40 alphanumeric characters.
DOB	Date of birth. Enter the DOB using a 4-character year (e.g., 1941). When specified, StressVue automatically calculates the patient's age.

**Table 2-3 Patient Information window fields** (continued)

Field Name	Description
Age	Patient's age. If DOB is not entered, enter the age. The age is used to calculate target heart rate.
Target HR	After you enter the patient's age (or it is calculated from DOB), StressVue calculates the target heart rate using the formula, $220 - \text{age}$ . You can override the calculated rate by typing a different value.
Sex	Patient's gender. Select male, female, or unknown from the dropdown list.
Height	Patient's height, in centimeters or inches. May contain up to four (4) numeric characters.
Weight	Patient's weight, in kilos or pounds. May contain up to three (3) numeric characters.
Address	Patient's address. (Optional)
Home/Work Telephone	Patient's contact numbers. (Optional)
Referring Physician	Name of the clinician ordering the test.
History check boxes	Select the appropriate check boxes, if any, to indicate whether the patient is a smoker, diabetic, has a history of MI, or has family history.
Indications	Indications for the stress exercise test. (Optional)
Medications	Medications and dosages, or other medication related comments. (Optional)
Notes	Additional comments. (Optional)

## Entering Patient Information

By default, when you begin the Pre-exercise phase, StressVue displays the Patient Information window. However, you can choose to enter this data after the test has been completed, from the Report window.

Use the keyboard (and the mouse, if desired) to enter patient identification information, as follows:

- Press the TAB key to move forward between fields using only the keyboard. Press SHIFT-TAB to move backward through fields. You can also use the mouse to click in a field so you can enter information.
- To select an item from a drop down list, tab to the field, then use the Up and Down arrow keys to navigate the list items.

- Use the mouse to select and clear check boxes.

#### To enter patient information

- 1 Fill in the fields as needed (page 2-18).
- 2 Click **OK** when finished to save the data and close the window.

#### To edit patient information

- 1 Move the cursor to the field to edit.
  - If using the mouse, double-click the data in the field to select it.
  - If using the keyboard, tab to the field. Any contents are selected.
- 2 Press **BACKSPACE** or **DELETE** to erase the data, then enter the desired information.

After the Learn mode is complete and you have entered demographic information, the Pre-exercise phase begins. The phase time clock starts, and the HR and ST level for the expanded lead are displayed together with the expanded average complex.

You can now acquire a resting ECG, baseline blood pressure, and proceed with the test.

## Acquiring a Resting ECG

StressVue allows you to acquire and print a 12-lead resting ECG with interpretation when the patient is supine.

#### To acquire a resting ECG

- 1 Have the patient resting still on a bed.
- 2 Click **Event** or press F4.  
The Event dialog box appears (page 2-32).
- 3 From the dropdown list, select **Supine**; then click **OK**.  
After a few seconds the StressVue system prints a full 12-lead resting ECG with measurements and interpretation text. For details about events, see “Recording an Event” on page 2-32.  
For details about print settings, see “Specifying Gain, Filter, and Print Settings” on page 2-11.
- 4 Ask the patient to stand-up and move to the treadmill or ergometer.

**NOTE** Prior to starting the exercise portion of the stress test, StressVue must relearn the ECG template while the patient is in the standing position, as described next.

**To relearn a patient's ECG**

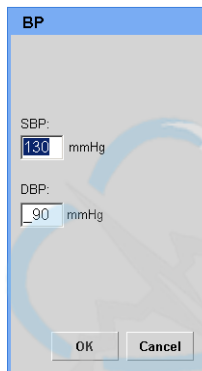
- 1 Click **ST Level** in the Command bar or press F7.  
The ST Level dialog box appears (page 2-28).
- 2 Click **Manual Avg**.
- 3 Click **Relearn**.

This process takes approximately twenty seconds. It causes StressVue to automatically relearn a new dominant QRS complex. This function is useful when a patient changes position (supine to standing) or the QRS morphology changes; for example, the patient goes into a rate-dependent bundle branch block. For more information, see “About the ST Level Settings” on page 2-28.

**Recording the Baseline Blood Pressure**

The Blood Pressure field in the Data panel of the window displays the last entered or acquired blood pressure reading. This control is used to either manually enter a blood pressure measurement or request an automatic blood pressure measurement from the optional SunTech Tango Blood Pressure Monitor. For details, see Appendix E, “Ordering Options and Parts.”

You can enter or acquire blood pressure values according to the pre-programmed automatic prompts or at any other convenient time.

**Figure 2-8 Blood Pressure dialog box****To record the baseline blood pressure**

- 1 After obtaining a blood pressure reading, click **BP** in the Command bar or press F3.  
The Blood Pressure dialog box appears.
- 2 Type the systolic and diastolic readings; then click **OK**.  
The background display turns yellow and the system beeps. Once the blood pressure value appears on-screen for 60 seconds (or 13 seconds into the new stage, whichever comes first), the value is cleared and replaced with dashes until a new value is entered.

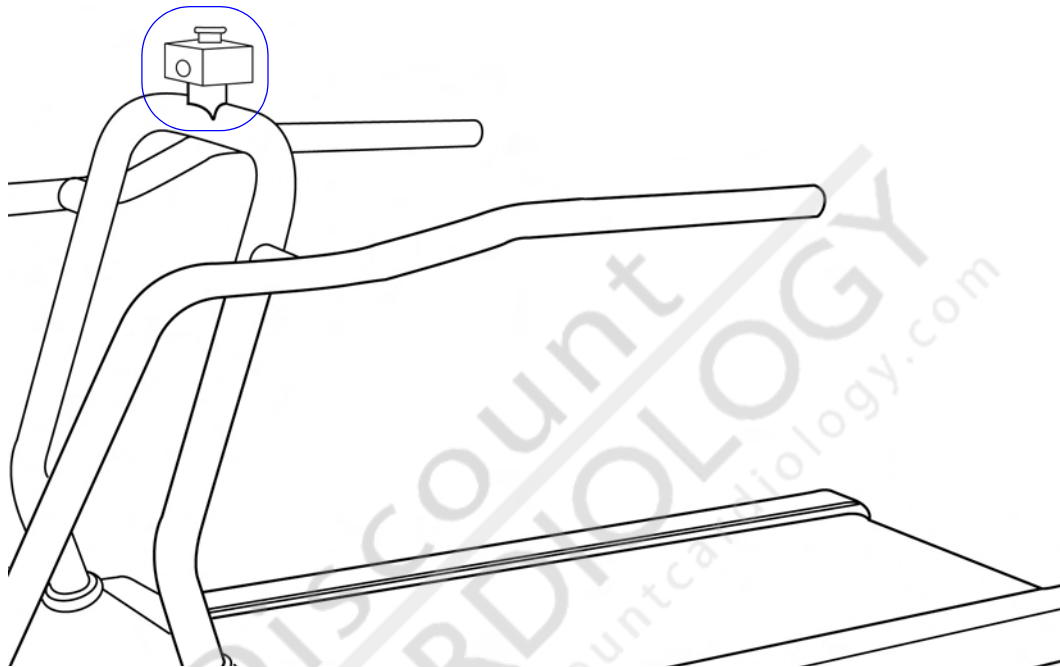
You are now ready to instruct the patient in the proper use of the equipment, and to proceed to the Exercise phase of the test.

## Instructing the Patient in Treadmill Use

Instruct the patient in proper treadmill use, as follows.

Note the location of the Emergency Stop button, illustrated below.

**Figure 2-9 Emergency Stop button on front rail of treadmill**



### To instruct a patient in treadmill use

- 1 Have the patient straddle the belt.
- 2 Instruct the patient to place his/her hands on the handrail for stability and to test the speed of the belt with one foot before transferring the other foot to the moving belt.
- 3 Turn on the power on the treadmill when the patient is properly straddling the treadmill.
- 4 In the StressVue application, click **Treadmill** in the Data panel or press F2.  
The Treadmill dialog box appears (page 2-35).
- 5 Click **On**.  
The treadmill starts at the pre-selected speed and elevation.
- 6 When the patient is acclimated to the movement of the belt, remind him/her to keep body straight and head up. The patient can walk in a normal walking position with arms at his/her sides or with wrists over the handrail.
- 7 Instruct the patient to use as little upper-body motion as possible and to stay near the front of the treadmill.

You are now ready to begin the test.

## Conducting the Exercise Stress Test (Exercise Phase)

At the start of an exercise stress test, StressVue acquires the initial 12-lead dominant QRS complex, which it uses to build the first QRS template for all 12 leads. The application updates the average QRS waveform for each of the 12 leads after every beat. If the dominant QRS morphology changes, the application automatically detects the new morphology and applies it as the new dominant beat. This event is labeled as DRC (Dominant Rhythm Change) in the Trends section of the screen.

During the test, you can print 12-lead ECGs automatically or manually. The ECG format can consist of four user-definable formats: 6x2, 3x4, 3x4+1, and 3x4+3. The format also presents an expanded average complex at 100mm/s and 40mm/mV (4X standard gain).

When you have recorded patient data and the system has learned the patient's dominant beat, you can start the Exercise phase of the test.

The Exercise phase comprises several stages, which are defined by the selected protocol. For a breakdown, see Appendix B, "Protocol Reference."

During this phase:

- The patient walks on the treadmill or rides the ergometer, unless the patient is unable to exercise.
- You record blood pressure, observed events, and RPE, while closely monitoring the patient.
- You can switch from an automated protocol to manual operation, giving you full control over the treadmill.
- You can change the display parameters, as needed.
- The pre-exercise clock is replaced by the total exercise clock and starts counting from 00:00.
- The stage clock appears below the total exercise time clock and starts counting from 00:00. The stage number is also displayed.
- If a treadmill or ergometer is turned on, the workload as defined in the exercise protocol or manual setting appears in the upper right corner of the window. The treadmill or ergometer respond to the displayed settings.
- Reference data is superimposed on the current data for each of the displayed ECG leads and the expanded average *auto compare complex*. As the heart rate increases and/or morphological changes occur, the black line represents current data and blue, the reference data.
- The Phase button label changes to **Recovery**.

### To start the test and move into the Exercise phase

- ▶ Click **Start Exe** in the Data panel or press F1.

The system initiates the Exercise phase of the test. The treadmill loads the settings associated with the first stage of the test, and the stage and phase clocks start counting.

Figure 2-10 Exercise phase started



## StressVue Display Options

The StressVue main window is configurable. You can specify:

- Which leads to view in real time (3, 6, 12, or 6 x 2) (below)
- Whether to display a zoomed view of an average complex for either a specified lead or for the lead that shows the most significant change in ST level (page 2-26)
- Whether to display any of the following information: trends, last rhythm event, or event on trends (page 2-30)

### About the Real-Time ECG Display

You can choose from four display formats for the real-time ECG:

- 3-lead.** Three channels consisting of 5 seconds of three user-defined leads.
- 6-lead.** Six channels consisting of 5 seconds of six user-defined leads.
- 6x2-lead.** Six split channels consisting of 2.5 seconds each of all 12 leads.
- 12-lead.** Twelve channels consisting of 5 seconds each of all 12 leads.

When you begin a test, the display format depends on the profile you are using. The default display format is set when the profile is defined in the Config screen. See “Configuring the Display” on page 5-20.

### To select the real-time ECG format

- 1 Display the Settings dialog box by clicking **Settings** in the Command bar or pressing F6.
- 2 Click the arrow next to the Realtime ECG field and choose the desired configuration.  
Options are: 3-lead, 6-lead, 6x2-lead, 12-lead
- 3 Click **OK** or press Enter to save your changes and close the dialog box.

The real-time ECG display reflects the settings you chose. In addition, the Average Complex display shows an average complex for each of the displayed leads.

The following examples show each of the formats.

**Figure 2-11 3-lead, 6-lead, 6x2-lead, 12-lead displays**

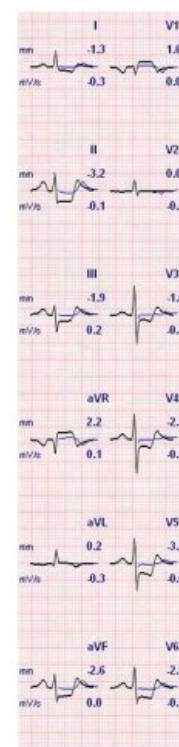


### About the Average Complex Display

The Average Complex display shows one average complex, for each of the displayed ECG leads, with ST level and slope, as well as superimposition of current and reference data. This section of the window is always displayed.

- For each lead, the averaged ECG is superimposed on the blue reference ECG so you can compare current and reference data.
- The absolute ST segment values and slope values are displayed to the right of each averaged ECG.
- If you change the format of the real-time ECG to display a different number of leads, the format of the averaged ECGs changes too.
- When StressVue is learning a new QRS shape, the averaged ECGs become flat lines, even though the real-time ECG continues to be displayed.

When you begin a test, the display format depends on the profile you are using. The default format for a profile is set when the profile is defined in the Config screen. During a test, you can change the real-time ECG display, which automatically changes the display of the averaged ECGs. See “About the Real-Time ECG Display” on page 2-24.



## About the Zoom ST Lead Display

The upper-right ECG display shows one expanded average ECG complex, an averaged ECG enlarged to four times the normal size. The zoomed ECG allows you to better visualize the ST segment changes during the test. See Figure 2-12 on page 2-26.

- For the zoomed lead, the averaged ECG is superimposed on the blue reference ECG so you can compare current and reference data.
- The absolute ST segment values and slope values are displayed for the expanded lead.
- You can select any lead as the zoomed lead. You can also specify that the lead with the most significant change in ST is automatically displayed.

When you begin a test, the lead shown in the zoomed display depends on the profile you are using. The default display for a profile is set when the profile is defined in the Config screen. A profile will not display a zoomed lead if the **Zoom ST Lead** check box is not selected.

You can specify which lead to display in this section; options are any of the twelve leads or a dynamically selected lead, where the lead with the most significant change in ST appears.

**Figure 2-12 Zoom ST Lead display, enabled**



**Figure 2-13 Zoom ST Lead display, disabled****To display or hide the Zoom ST Lead display**

- 1 Display the Settings dialog box by clicking **Settings** in the Command bar or pressing F6.
- 2 Select or clear the Zoom ST Lead check box.  
When the Zoom display is disabled, the window shows an expanded view of the real-time ECG traces. See page 2-27.  
For details about selecting the lead to display, see the next section.
- 3 Click **OK** or press Enter to save your changes and close the dialog box.

**Selecting the Zoom ST Lead**

You can specify which lead to highlight in the Zoom display (Figure 2-12). You can change the selection at any time during the patient session. Options are:

**Any individual lead.** Any of the twelve leads. This selection remains in force until you change it.

**Dynamic.** The system monitors all twelve leads and displays the one with the most significant ST change. Which lead appears changes automatically during the stress test; the changes are reflected on printed reports, as well.

**Max Depression/Max Elevation.** The system displays the lead with the greatest ST depression or elevation at that moment.

**Max ST/HR Index.** The system displays the lead with the greatest ST/HR index at that moment.

**To select the lead for the Zoom ST Lead display**

- 1 Display the ST Level dialog box by clicking **ST Level** in the Command bar or pressing F7. See Figure 2-14 on page 2-28.
- 2 Click the dropdown list and select the lead to highlight in the display.

**NOTE** Whichever lead is selected as the Zoom ST Lead, the ST change trend for this lead is also displayed in the Trend display.

- 3 Set the J-ST interval, if desired, by clicking the Up or Down arrows.  
This value is the time interval between the J point and the ST measurement point. See also “About the ST Level Settings,” next.

**NOTE** Once a test is in session, you can no longer change this value; you can only change the ST Lead.

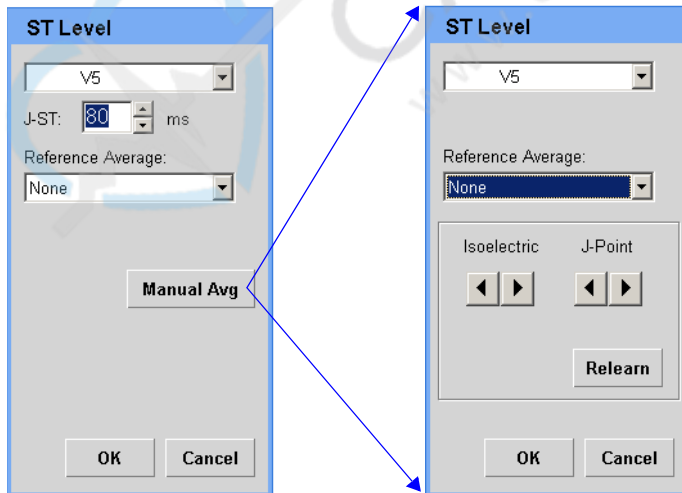
- 4 Click **OK** or press Enter to save your changes and close the dialog box.

**About the ST Level Settings**

The system displays the ST value in microvolts (or mm) for the on-screen average complexes. Use the ST Level dialog box for manipulating the following settings and measurements:

- QRS onset (page 2-29)
- QRS offset, or J-point (page 2-29)
- Generate a new dominant QRS complex (page 2-30)
- J-ST time interval (above)
- Reference average

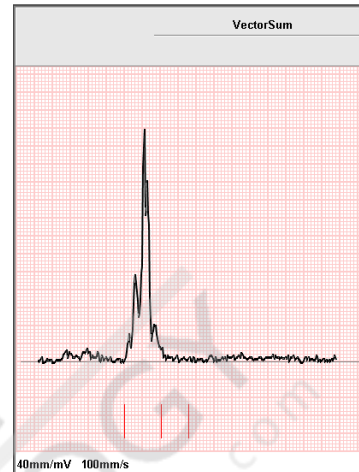
**Figure 2-14 ST Level dialog box (left) and with Manual Avg selected (right)**



Under most circumstances, StressVue accurately establishes the QRS Onset and QRS Offset (J point) of the cardiac cycle. There are, however, complicated rhythms that may disrupt this process. For example, noise in the initial ECG may cause StressVue to place the QRS Onset and QRS Offset in unsatisfactory positions, thereby generating incorrect ST measurements.

The application allows you to adjust the QRS Onset and QRS Offset at any time after the template is learned to positions believed to be more accurate.

The **Manual Avg** button provides access to the isoelectric and J-point adjustment buttons, allowing you to change the QRS Onset and Offset values. In addition, it removes the reference data of the expanded average complex and displays a spatial magnitude complex in the expanded average complex window. The spatial magnitude complex is the summation of high-frequency signal magnitudes (vector sum) of all 12 leads. This process allows you to visually adjust the QRS Onset and/or QRS Offset using information from all 12 leads simultaneously.



### Adjusting QRS Onset and Offset

StressVue displays red tick marks at the QRS Onset of the spatial magnitude complex, at the J-point (QRS Offset) and at the ST measurement point defined by the user (for example, J + 60).

**NOTE** The interval between QRS Offset and the ST measurement point is not altered when changing the QRS Offset. For example, adjusting the QRS Offset 10 milliseconds to the right produces a concurrent 10-millisecond shift to the right of the ST measurement point.

You can also retrospectively adjust the QRS Onset and/or the QRS Offset during the final report phase. After adjustments are made, StressVue generates final reports in which all ST levels printed correspond to the degree of QRS Onset/Offset adjustment.

#### To adjust the QRS Onset

- 1 Display the ST Level dialog box by clicking **ST Level** in the Command bar or pressing F7.
- 2 Click **Manual Avg**.  
The Isoelectric and J-Point settings appear.
- 3 Using the spatial magnitude complex as a visual guide, click the Isoelectric left arrow to shift the QRS Onset tick marks to the left, the right arrow to shift the tick marks to the right.  
Each discrete click represents a change of two milliseconds.
- 4 Proceed to adjusting the QRS Offset, if necessary; then click **OK** to save the changes and close the dialog box.

After you adjust the QRS Onset, StressVue updates all ST measurements on the screen. 12-lead ECGs obtained after a change also reflect the updated tick mark position.

**To adjust the QRS Offset**

- 1 Display the ST Level dialog box by clicking **ST Level** in the Command bar or pressing F7.
- 2 Click **Manual Avg**.  
The Isoelectric and J-Point settings appear.
- 3 Using the spatial magnitude complex as a visual guide, click the J-Point left arrow to shift the QRS Offset tick marks to the left, the right arrow to shift the tick marks to the right.  
Each discrete click represents a change of two milliseconds.

After you adjust the QRS Offset, StressVue updates all ST measurements on the screen. 12-lead ECGs obtained after a change also reflect the updated tick mark position.

**Creating an ECG Template**

During the Pre-exercise phase, StressVue automatically starts the *Learn* process, during which it acquires ECG data to develop the patient's cardiac template, and uses this template for arrhythmia detection.

The *Relearn* function causes StressVue to automatically relearn a new dominant QRS complex. This function is useful when a patient changes position (supine to standing) or the QRS morphology changes; for example, the patient goes into a rate-dependent bundle branch block.

**To learn a new dominant QRS complex**

- 1 Display the ST Level dialog box by clicking **ST Level** in the Command bar or pressing F7 (page 2-28).
- 2 Click **Manual Avg**.
- 3 Click **Relearn**.  
StressVue acquires the ECG data and generates a new dominant QRS complex. The Data panel displays the text, *ST Learning*, while this process takes place. When the dominant template has been established, the Data panel displays the measured ST level.

**NOTE** When you select the *Relearn* function, the system erases any previously stored events in the Reference Average list in the ST Level dialog box (page 2-31).

**Displaying Running Trends**

You can configure the Running Trends display to show trends only, last rhythm event only, or event on trends, which displays the last event over the trends for a period of 10 seconds. After ten seconds, the rhythm event disappears and the trends are displayed. The rhythm event appears in three user-defined leads.

**To select the trends to display**

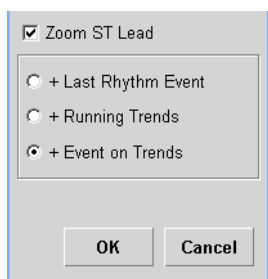
- 1 Display the Settings dialog box by clicking **Settings** in the Command bar or pressing F6.
- 2 Select the trend option to display.

These options are available only in the Exercise phase, and only if the Zoom ST Lead option is selected (page 2-27). Display options are:

**Last Rhythm Event.** Displays the last rhythm event.

**Running Trends.** Displays running trends of the HR, ST level, and Mets.

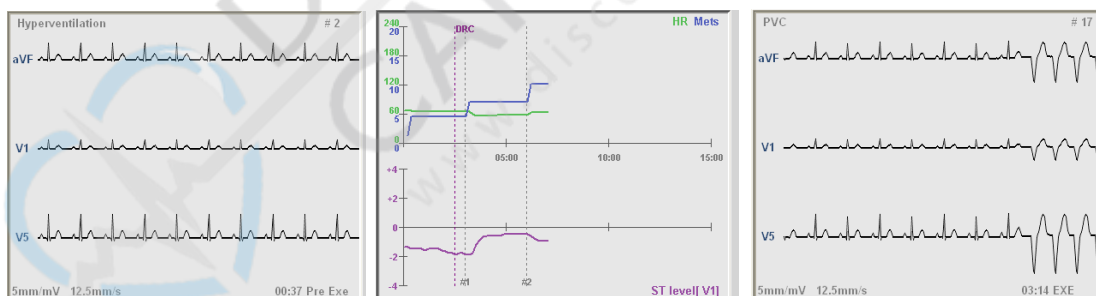
**Event On Trends.** Displays running trends of the HR, ST level, and Mets, and the last rhythm even appears over the running trends for 10 seconds.



- 3 Click **OK** to save the settings and close the dialog box.

The following examples show the result of having each of these settings enabled.

**Figure 2-15 Last Rhythm Event, Running Trends, Trends on Event displays (left to right)**



**Selecting the Reference Average to Use**

The list of available events to use for reference is populated by events you have selected in the Events dialog box (page 2-32), up to a maximum of eight entries.

**To select the reference average**

- 1 Display the ST Level dialog box by clicking **ST Level** in the Command bar or pressing F7 (page 2-28).

The Reference Average field displays previously selected events, such as Supine, Standing, Hyperventilation, and so on. The entries Start Exe and Peak Exercise are added to the reference list once you enter the Exercise and Recovery phases.

- 2 Select the desired event to use for comparison from the **Reference Average** dropdown list. Your selection changes the reference data on the ST Profile bar graph and expanded average Auto Compare complexes on the display and ECG reports.

**NOTE** When you select the *Relearn* function (page 2-30), the system erases any previously stored events in the list.

## Recording Blood Pressure

The **Blood Pressure** field in the Data panel of the window displays the last entered or acquired blood pressure reading. For details about recording blood pressure, see “Recording the Baseline Blood Pressure” on page 2-21.

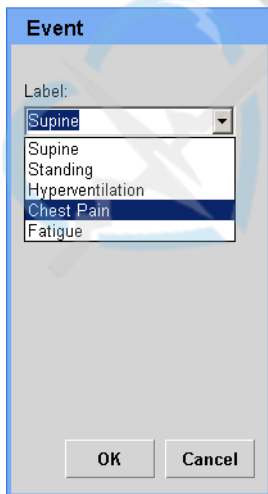
## Recording an Event

As the test progresses, you can record events if and when they occur. When you record an event, StressVue generates a 12-lead ECG, and documents the event name on the ECG. The system also stores the event in memory and will print it in the Rhythm Events portion of the final report.

You can also specify that StressVue automatically record the following arrhythmia events: PVC, couplet, and ventricular run. See “Automatic Arrhythmia Recording” on page 2-33.

Events are associated with the selected profile. You can add events to and delete events from the list through the Configuration window. For details, see “Configuring Events” on page 5-26.

**Figure 2-16** Event dialog box



**To record an event**

- 1 Click **Event** in the Command bar or press F4.  
The Event dialog box appears.
- 2 Select the event to record, then click **OK**.  
Examples of options include: supine, standing, hyperventilation, chest pain, fatigue.  
The system prints an ECG and records the event for the final report.

**Automatic Arrhythmia Recording**

You can specify that StressVue automatically print any of the following arrhythmia events: PVC, couplet, or ventricular run.

You can also specify, for each profile, the number of arrhythmia reports to print per minute for each of these events.

**To enable automatic arrhythmia report printing**

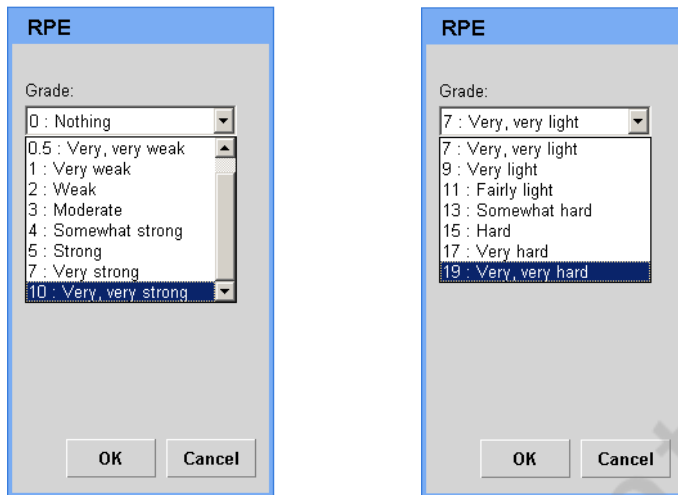
- 1 Display the Settings dialog box (page 2-12) by clicking **Settings** in the Command bar or pressing F6.
- 2 Ensure the Arrhythmia Printouts check box is selected, then click **OK**.  
To disable automatic arrhythmia report printing, clear the check box.

**Recording RPE**

The Rate of Perceived Exertion (RPE) scale provides an indication of the percentage of maximum work being done by a patient. The RPE scale subjectively rates work (physical exertion) as stated by the exercising patient. It provides a means to quantify a patient's level of exertion.

RPE scales can be expressed in two ways, 0 to 10 or 6 to 20. The scale used is associated with the selected user profile, defined in the Configuration window. See "Setting the RPE Scale" on page 5-15. The list begins with Nothing or Very, very light and ends with Very, very strong or hard, with various grades of effort in between.

Ask patients to state which number/statement represents their perceived level of work as listed on a wall-mounted poster or on a scale from 0 to the maximum. You then select the corresponding item in the RPE dialog box. The system prints an ECG report, noting the RPE. The RPE ECG average complex data is also held in memory, and is printed in the Rhythm Events section of the final report.

**Figure 2-17 RPE dialog box, both scales illustrated****To record the patient's RPE**

- 1 Display the RPE dialog box by clicking **RPE** or pressing F5.
- 2 Select the RPE statement that matches what the patient reports, and click **OK**.  
The system prints an ECG with the RPE statement.

**Controlling the Treadmill or Ergometer**

**NOTE** Because certain button and dialog box names depend on whether a treadmill or ergometer protocol is in use, this section simply refers to the **Treadmill** button and *Treadmill* dialog box. If you are using the Bicycle protocol, the button is labeled **Ergomet** and the dialog box is labeled *Ergomet*; the functionality, however, is the same.

From within StressVue, you can control the following treadmill and ergometer functions. You can:

- Power the equipment on or off (page 2-35)
- Control the speed (treadmill) or Watts (ergometer) (page 2-35)
- Control the grade (treadmill) (page 2-35)
- Hold a stage or advance to the next stage (page 2-37)

## Powering the Equipment On and Off

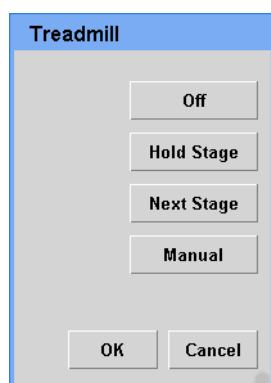
**NOTE** Because certain button and dialog box names depend on whether a treadmill or ergometer protocol is in use, this section simply refers to the **Treadmill** button and *Treadmill* dialog box. If you are using the Bicycle protocol, the button is labeled **Ergomet** and the dialog box is labeled *Ergomet*; the functionality, however, is the same.

You can turn the treadmill or ergometer on or off from within StressVue.

### To turn the equipment on and off

- 1 Click **Treadmill** in the Data panel or press F2.  
The Treadmill dialog box appears.

**Figure 2-18 Treadmill dialog box**



- 2 Click **On** or **Off**.  
The button label changes depending on the current state of the machine.

## Controlling Equipment Speed and Grade/Resistance

**NOTE** Because certain button and dialog box names depend on whether a treadmill or ergometer protocol is in use, this section simply refers to the **Treadmill** button and *Treadmill* dialog box. If you are using the Bicycle protocol, the button is labeled **Ergomet** and the dialog box is labeled *Ergomet*; the functionality, however, is the same.

During the course of an exercise test, you may elect to exit the selected protocol and control the workload yourself. Doing so allows you to customize the exercise test to the patient's ability.

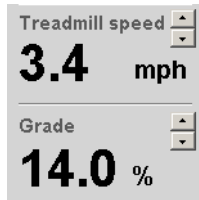
- NOTES**
- When you manually control the stress test, you cannot resume a pre-set protocol; you must finish the Exercise portion of the test in manual mode. When you phase into recovery, the pre-set recovery parameters automatically resume control of the treadmill.
  - If the treadmill is off and a report is printed, dashes appear next to the Speed (mph) and Grade (%) fields. However, if the treadmill is on and a report is printed, appropriate corresponding values print in the Speed and Grade fields.

You can control the equipment using either of two methods:

- Change the settings directly on the Data panel
- Change the settings through the dialog box; this option also allows you to hold or advance a stage

**To manually control the treadmill or ergometer from the Data panel**

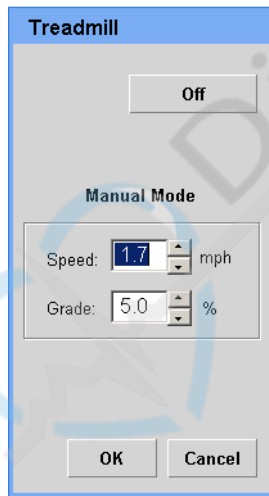
- ▶ Click the Up and Down arrows next to the Speed and Grade fields in the Data panel.



- To speed up the treadmill, click the Up arrow in the Treadmill speed field. To slow it down, click the Down arrow.
- To increase the grade of the treadmill, click the Up arrow in the Grade field. To lower the ramp, click the Down arrow.

**To manually control the treadmill or ergometer through the dialog box**

- 1 Click **Treadmill** in the Data panel or press F2.  
The Treadmill dialog box appears. See page 2-36.
- 2 Click **Manual**.  
The speed and grade settings appear.



- 3 Change the settings as needed; then click **OK**.
  - To speed up the treadmill, click the Up arrow in the Treadmill speed field. To slow it down, click the Down arrow.
  - To increase the grade of the treadmill, click the Up arrow in the Grade field. To lower the ramp, click the Down arrow.

## Holding or Advancing Exercise Stages

**NOTE** Because certain button and dialog box names depend on whether a treadmill or ergometer protocol is in use, this section simply refers to the **Treadmill** button and *Treadmill* dialog box. If you are using the Bicycle protocol, the button is labeled **Ergomet** and the dialog box is labeled *Ergomet*; the functionality, however, is the same.

You can hold or advance individual stages of an exercise test. For example, you might want to monitor the patient in a situation where the workload parameters do not change for a given amount of time, without leaving the selected protocol. Alternatively, you might want to progress the patient more quickly through the first few stages of the selected protocol.

### To hold the current stage

- 1 Click **Treadmill** in the Data panel or press F2.  
The Treadmill dialog box appears. See page 2-36.
- 2 Click **Hold Stage**; then click **OK**.  
The timer keeps running, but the system stays in the current stage.

### To disengage the hold

- 1 Click **Treadmill** in the Data panel or press F2.  
The Treadmill dialog box appears. See page 2-36.
- 2 Click **Stop Hold**; then click **OK**.  
The speed and grade fields return to their default color. StressVue resumes the current stage from where it left off. That is, the total amount of scheduled time for the stage must elapse before advancing to the next stage of the protocol.

### To manually advance to the next stage

- 1 Click **Treadmill** in the Data panel or press F2.  
The Treadmill dialog box appears. See page 2-36.
- 2 Click **Next Stage**.  
The selected protocol advances to the next exercise stage in both the speed and grade settings.

## Printing an ECG

You can generate 12-lead ECGs during all phases of the test. The ECG report is printed based on the configuration settings defined for the selected profile. You can also print a continuous rhythm strip.

### Printing an ECG

The ECG report contains the following elements:

- One of the following formats:
  - 6 x 2:** 3.5 seconds of each lead
  - 3 x 4:** 1.75 seconds of each lead
  - 3 x 4 + 1:** 1.75 seconds of each lead + 7 seconds of one user defined rhythm lead
  - 3 x 4 + 3:** 1.75 seconds of each lead + 7 seconds of three user defined rhythm leads
- One average complex for each of the 12 leads
- The superimposed expanded average complex, with reference data (presented as a dotted line for the ST segment and T wave)
- The patient's name, date, time, stage time, stage number, total exercise time, workload, lead labels, ST values, and calibration pulses

#### To print an ECG

- ▶ Click **ECG** in the Command bar or press F10.

The system prints an ECG report based on the settings you have specified in the profile.

### Printing a Continuous Rhythm Strip

You can print a continuous rhythm strip. The system generates a continuous six-channel report of the leads specified in the configuration for the particular profile. For details, see "Configuring Print Settings for Rhythm Events" on page 5-23.

The continuous rhythm strip contains the patient's name, date, time, stage time, total exercise time, workload, lead labels, and calibration pulses. You can generate continuous rhythm strips during all phases of a test. Any scheduled automatic 12-lead or manually generated events interrupt continuous rhythm printing; however, printing resumes once the 12 lead or event has printed.

You set the speed of the continuous rhythm strip in the Configuration window. Options include: 5mm/s, 10mm/s, 25mm/s, and 50mm/s.

#### To print a continuous rhythm strip

- 1 Click **Rhythm** in the Command bar or press F8.  
The **Rhythm** button label changes to **Rhy Leads**. The rhythm leads specified in the profile print first.
- 2 Click **Rhy Leads** to change to printing leads I, II, III, AVR, AVL, AVF.  
Click it again to print leads V1 to V6.  
Click again to print the leads specified in the profile.

**To stop continuous rhythm printing**

- ▶ Click **Stop Print** in the Command bar or press F9.  
The system stops printing a continuous rhythm strip.

This function only applies to continuous rhythm printing; it does not affect any ECG printing.

## Entering the Recovery Phase

When the patient can no longer continue exercising, you end the Exercise phase of the stress test and begin the Recovery phase. Generally, you terminate the Exercise phase when the patient reaches a percentage of their maximal predicted heart rate (MPHR). The clinician determines the end point according to patient's status and many patients never reach 100% MPHR. If the reading reaches 100% of the MPHR, the graph indicator color changes from aqua to red.

If the last exercise stage of the protocol is completed, StressVue automatically enters the Recovery phase.

During the Recovery phase:

- The system automatically prints a 12-lead ECG labeled **PEAK EXE**. The 12-lead ECG is printed at this stage transition regardless of system settings. The **PEAK EXE** 12-lead ECG overrides any other ECG or rhythm strip print job in process.
- The total exercise time clock freezes.
- The recovery time clock replaces the stage clock. The recovery stage number is also displayed.
- The Phase button label changes to **End**.
- StressVue advances the treadmill or ergometer to the recovery workloads specified in the protocol.
- Select **Treadmill** (or press F2) to open the window to stop the treadmill.
- You can enter report notes describing why the patient ended the Exercise phase of the test, the patient's symptoms, and conclusions.

**To move into the Recovery phase**

- ▶ Click **Recovery** in the Data panel or press F1.

The system moves into the **Recovery** phase of the test. The treadmill loads the settings associated with the first stage of recovery, the total exercise time clock freezes, and the recovery time clock replaces the stage clock.

Figure 2-19 Recovery phase started



## Adding Report Notes

During the Recovery phase, you can add report notes describing why the patient ended the Exercise phase of the test, the patient's symptoms, and conclusions. These fields can be updated later in the Report Manager.

Figure 2-20 The Report Notes window



**Table 2-4 Report Notes window fields**

Field Name	Description
Technician	Your name or ID.
Reviewing Physician	The name of the physician who is overseeing the test or the physician who will approve the final report.
Reasons for End	Why you ended the Exercise phase of the test.
Symptoms	Patient symptoms you noted or complaints by the patient.
Conclusions	Comments. Usually includes results and suggestions for follow-up testing. Generally completed by the reviewing physician.

**To add report notes**

- 1 Click **Report Notes** in the Data panel.  
The Report Notes window appears.
- 2 Fill in the fields in the Report Notes window as needed.  
You can update these fields later during the Report phase of the test.
- 3 Click **OK** when finished to save the data and close the window.  
The system returns to the Recovery phase screen.

## Ending the Patient Session

You end the stress test and begin the Report phase when the patient has recovered from the effects of exercise. If the patient completes the last stage of the recovery portion of the protocol, then StressVue automatically moves into the Report phase.

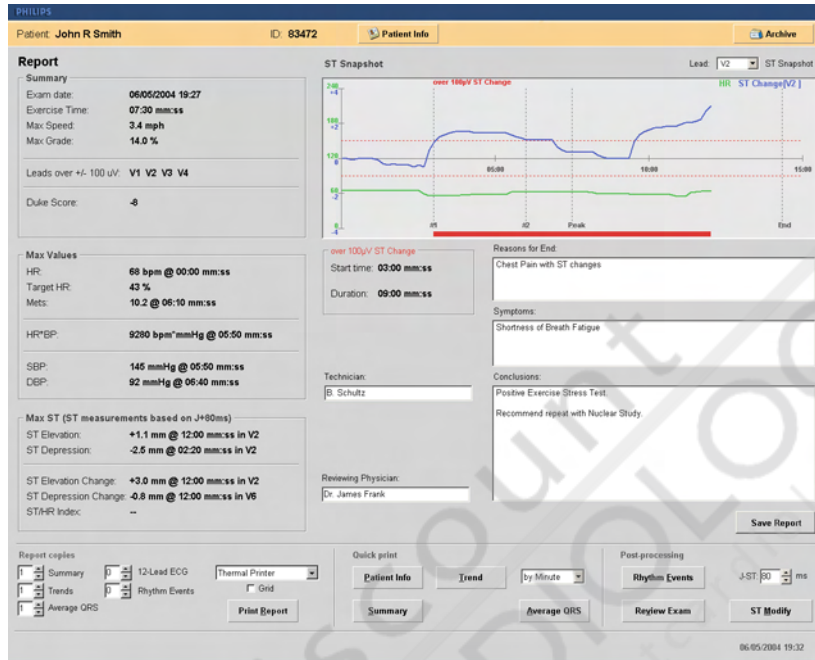
During the Report (End) phase:

- StressVue freezes the recovery display while the test information is transferred to system storage
- StressVue loads the Report Manager, so you can specify the parameters and format of the final report.

**To end the patient session and move into the Report phase**

- ▶ Click **End** in the Data panel or press F1.

The system moves to the Report phase of the test and displays the Report Manager.



For details about the Report Manager and about working with the final report, including viewing, editing, printing, and saving reports, see Chapter 3, “Working with Reports.”

## Working with Reports

When the patient finishes the Recovery phase of the stress test, StressVue moves to the Report phase. From the Report Manager screen, you can review and modify the content of the final test report. You can print the individual reports that can be included in the final report, save the report, and print it. After you save the report, you can export it to a PDF file for distribution or storage. When you export the report to a PDF file, it can no longer be edited.

This chapter provides the following information:

About the Report Phase . . . . .	3-2
The Report Manager screen . . . . .	3-2
Reviewing and Editing Test Data . . . . .	3-4
Adding or Updating Report Notes . . . . .	3-4
Adding or Updating Patient Information . . . . .	3-4
Reviewing ST Snapshots . . . . .	3-5
Reviewing Rhythm Events . . . . .	3-5
Reviewing the Test . . . . .	3-7
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 Saving Multiple Reports (Exam Reports) . . . . . 3-19  
 Printing Multiple Reports (Print Reports) . . . . . 3-19  
 Exporting Multiple Reports (Export Exams) . . . . . 3-20  
 Viewing Reports Saved as PDF Files . . . . . 3-20

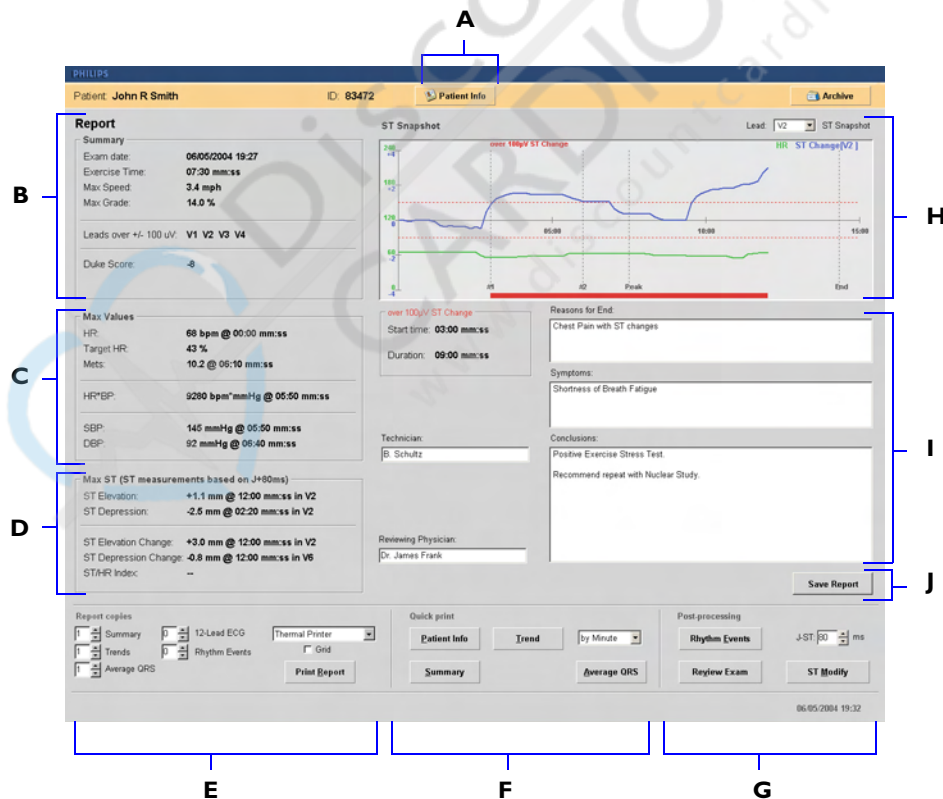
## About the Report Phase

During the Report phase of the test, you work from the Report Manager screen to review, update, and save the data for the final report. When the report data is satisfactory, you can print the individual reports that may be included in the final report, save the report, and print it.

## The Report Manager screen

The Report Manager screen appears when you click **End** or press F1 to end the Recovery phase of the test.

**Figure 3-1 Report Manager**



**Table 3-1 Report Manager fields**

Description	For more information, see...
<b>A</b> Patient info button Click to add or update patient data in the Patient Info window.	“Adding or Updating Patient Information” on page 3-4
<b>B</b> Summary Displays basic information about the test.	“Summary Report” on page 3-10
<b>C</b> Max Values Displays maximum values for heart rate, Mets, double product, and blood pressure.	“Summary Report” on page 3-10
<b>D</b> Max ST Displays ST Elevation and ST Depression times and leads, amount of ST change, and ST/HR Index. Note: Patients may already have ST elevation or depression before exercise begins. It is important for the clinician to see how much change occurs during exercise.	“Summary Report” on page 3-10
<b>E</b> Report copies Specify the contents of the final report printout (after you save the report). Select: <ul style="list-style-type: none"> <li>– The number of copies of each individual report to print, if any</li> <li>– What printer to use</li> <li>– Whether to print a grid</li> </ul> Click Print Report to print the final report.	“Printing the Final Report” on page 3-16
<b>F</b> Quick print Click to print any or all of four individual reports (before or after you save the final report).	“Quick Printing” on page 3-15
<b>G</b> Post-processing Click to review or edit test data. You can: <ul style="list-style-type: none"> <li>– Review rhythm events</li> <li>– Review the test</li> <li>– Modify the ST measurement point</li> </ul>	“Reviewing and Editing Test Data” on page 3-4
<b>H</b> ST Snapshot Select a lead, then review the heart rate and ST change graph. Below the graph, you can review the start time and duration of any ST Change greater than 100 mV.	“Reviewing ST Snapshots” on page 3-5

**Table 3-1 Report Manager fields** *(continued)*

Description	For more information, see...
<b>I</b> Report Notes Add or change five fields: <ul style="list-style-type: none"> <li>– Technician</li> <li>– Reviewing Physician</li> <li>– Reasons for End</li> <li>– Symptoms</li> <li>– Conclusions</li> </ul>	“Adding or Updating Report Notes” on page 3-4
<b>J</b> Save Report button Click to save the report so it can be printed or exported.	“Saving the Final Report” on page 3-9

## Reviewing and Editing Test Data

### Adding or Updating Report Notes

On the Report Manager screen, you can add to or change the five fields of Report Notes:

- Technician
- Reviewing Physician
- Reasons for End
- Symptoms
- Conclusions

See “Adding Report Notes” on page 2-40 for detailed information on the Report Notes window.

### Adding or Updating Patient Information

From the Report Manager screen, you can enter or update information about the patient. If you did not fill in the Patient Info window during the Pre-exercise phase, you must do it now.

#### To add or update patient information

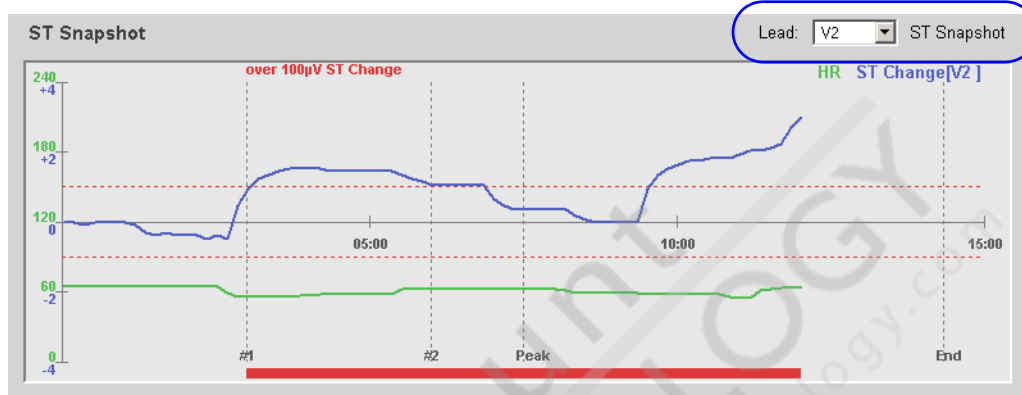
- 1 Click **Patient Info** at the top of the Report Manager screen.  
The system displays the Patient Info window on top of the Report Manager screen.
- 2 Enter or change the fields as needed.  
For details, see “Adding or Updating Patient Information” on page 3-4.
- 3 Click **OK** when finished to save the data and close the window.  
The Report Manager screen is still displayed.

## Reviewing ST Snapshots

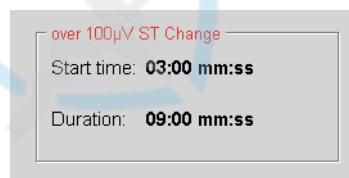
On the Report Manager screen, you can review a graph showing the amount of ST Elevation and ST Depression change for any lead.

### To review the ST snapshot for a lead

- 1 Click the dropdown arrow at the top right to select the lead to review.



- 2 Review the heart rate and ST change.
  - Heart rate is **green**.
  - ST Change is **blue**.
  - **Red** dotted lines represent 1 mm or 100 µV elevation and depression from the patient's baseline, which is shown as 0 (zero).
  - The thick **red** line at the bottom shows the amount of time the patient had 1 mm or more of ST segment elevation or depression.
  - Below the graph, you can review the start time and duration of ST Changes greater than 100 µV.



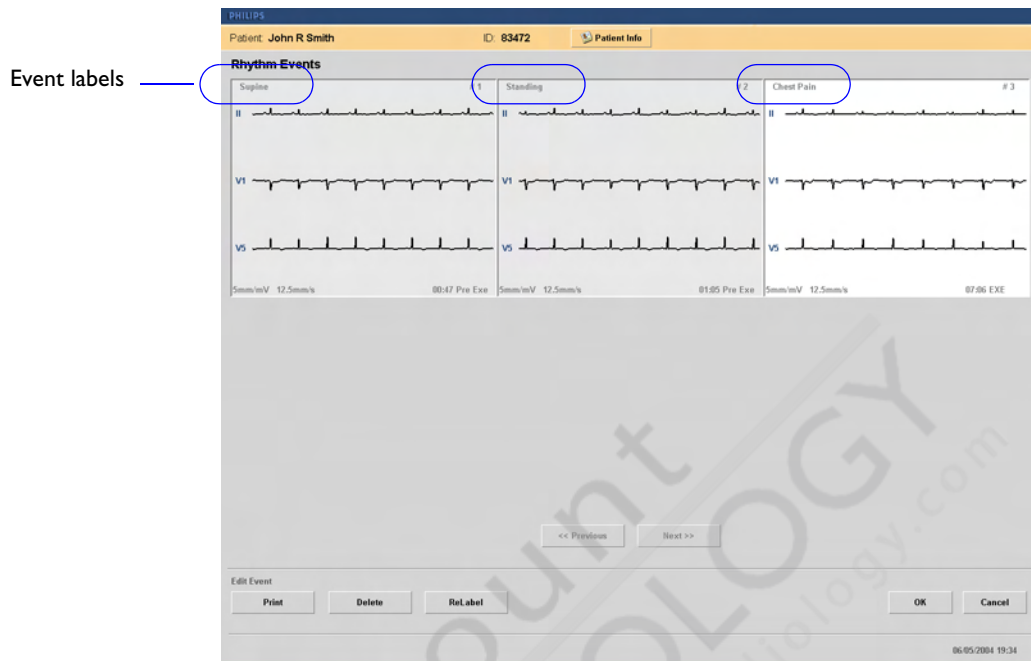
- 3 Select other leads to review as needed.

## Reviewing Rhythm Events

The Rhythm Events screen displays a snapshot of all events, captured arrhythmias, and RPE scale selections acquired during the stress test. If 12-Lead ECG was selected as a default report in the Printout tab of the user profile, the 12-Lead ECGs that were automatically printed during the Exercise and Recovery phases are included with the rhythm events.

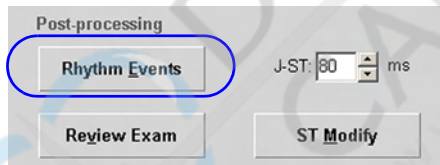
From this screen, you can review the rhythm events, print them, delete events that you do not want to include in the final report, and relabel events more appropriately.

Figure 3-2 Rhythm Events window



### To review rhythm events

- 1 Click **Rhythm Events** from the Post-processing area at the bottom right of the Report Manager screen.



The Rhythm Events window appears, showing up to six events. See Figure 3-2, above.

- 2 To see additional events, click **Next** or **Previous**.
- 3 To select an event, click anywhere in the event snapshot to highlight it.
- 4 Review the event.
  - Click **Print** to print the event.
  - Click **ReLabel** to change the identifying label in the upper left corner of the event snapshot. See Figure 3-2.
  - Click **Delete** to delete the event. The word **Deleted** appears across the event in red.
- 5 Review each event as needed.
- 6 Click **OK** when finished to save your changes and close the window. All deleted events are removed from the list.

The Report Manager screen appears.

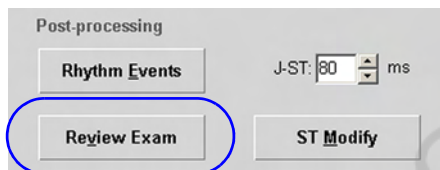
## Reviewing the Test

You can replay the entire stress test on screen at any time after you enter the Report Phase. This is especially helpful if you wish to review a specific segment of the test. When reviewing a test, you can:

- Change the ECG waveform speed from real-time speed to four times faster or slower
- Pause the display
- Print or reprint a 12-lead ECG or rhythm strip for significant episodes
- Move the trend cursor to any location to skip forward or back in time

### To review the test

- 1 From the Post-processing area at the bottom right of the Report Manager screen, click **Review Exam**.



The Exam Review screen appears. The ECG data appears at real-time speed.

This screen is almost the same as the Exercise phase screen, except different commands are displayed at the bottom of the data panel and the speed of the test replay appears in the Command bar at the lower left of the screen.



- Change the speed of the replay as needed by clicking the buttons on the data panel.



- **Fast:** Each click increase the playback speed by .05 times the real-time speed. You can increase the speed up to four times the real-time speed.
  - **Slow:** Each click decreases the playback speed by .05 times the real-time speed. You can decrease the down to one-fourth the real-time speed.
  - **Pause:** Freezes and unfreezes the playback display.
- Review different time frames in the test as needed by clicking on the Trends graph.  
A vertical marker indicates the current time into the test. When you click on the Trends graph, the replay mode is restarted at the time in the test that corresponds to the position you selected on the graph.
  - Click **End** or press F1 to end the test review and return to the Report Manager.

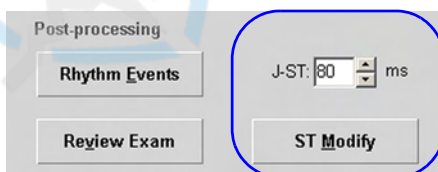
You can review any test after you have saved it by selecting it from the Archive screen, then clicking **Review Exam**.

## Modifying the ST Measurement Point

You can reanalyze the stress test using a different ST measurement point.

### To modify the ST measurement point

- From the Post-processing area at the bottom right of the Report Manager screen, click the up or down arrow to change the value in milliseconds for **J-ST**.



- Click **ST Modify**.

StressVue recalculates all related values and updates the corresponding displays on the Report Manager screen. The new ST value automatically replaces the old one, even if you do not save the report.

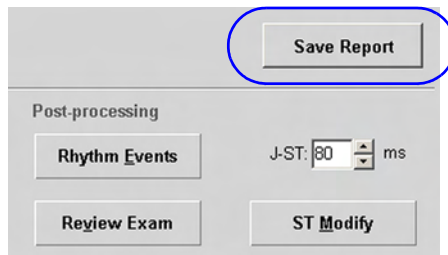
## Saving the Final Report

When you finish updating and reviewing the report data, you can save the report.

### To save the final report

- ▶ Click **Save Report**, located on the right of the Report Manager screen just above the Post-processing area.

The stress test is considered “Reported.” The Report Manager is still displayed.



You can now print the final report from the Report Manager screen. See “Printing the Final Report” on page 3-16.

A test is listed on the Archive screen as soon as the test is completed, even if you have not yet saved it. You can click **Archive** to display the Archive screen, then review, modify, or print the test. If the report has been saved, **Y** appears in the **Report** column on the Archive screen and you can export it to a PDF file. See “Working with Archived Reports” on page 3-16.

You may choose not to save the report now, then do it later one of two ways:

- You can display the test from the Archive screen, modify it as needed, then save it. See “Viewing a Report” on page 3-17.
- You can save several reports at once using the batch save operation. See “Saving Multiple Reports (Exam Reports)” on page 3-19.

## The StressVue Reports

StressVue allows you to choose several individual reports to include in the final test report. In the Printout tab of the user profile, you set the defaults specifying which reports are included in the final report. However, you can change those settings from the Report Manager screen.

The header set in the Miscellaneous tab of the user profile prints in the lower left corner of each page of the reports.

Each report is described in this section.

## Patient Information Report

The Patient Information Report includes all demographic information entered in the Patient Info window. This report is automatically printed as the first page of the final test report. You can also print it manually.

### To manually print the Patient Information report

- ▶ Select **Patient Info** in the Quick Print area of the Report Manager.

**Figure 3-3 Patient Information Report**

<b>Patient 4 Sample 4</b> <b>04/01/2004 12:49</b> <b>3 MM ST DEP</b>		<b>68 yrs</b> <b>Female</b> <b>Protocol: BRUCE</b>	
<b>Patient Data</b>			
Last Name: Sample 4 First Name: Patient 4 Middle Name: ID: 3 MM ST DEP Second ID: 332-32-5325		Date of Birth: 10/15/1935 Age: 68 Target HR: 142 Gender: Female Race: Caucasian Height: 62 in Weight: 135 lbs	
Address: 132 Ocean Drive Palm Beach, FL 33523  Home Phone: 772-323-5832 Work Phone: N/A Physician: Dr. Jamieson		Smoker: No Diabetic: No History of MI: Yes Family History: No	
Indications Follow Up Post Stent Placement			
Medications Coumadin, Aspirin			
Notes C/O some Chest Discomfort			
St. Mary's Hospital		Philips StressVue V1.0	

## Summary Report

The Summary Report includes the following information on page 1 of the report (see Figure 3-4 on page 3-11):

- Summary data displayed on the Report Manager screen
  - Date and time of test
  - Total exercise time
  - Maximum treadmill (or ergometer) speed and grade achieved during test
  - ECG leads that presented more than 100 uV (or 1 mm) of ST elevation or depression during test
  - Duke Score (treadmill only)
  - Functional Aerobic Impairment (FAI%). Only for Bruce protocol

- Max Values data displayed on the Report Manager screen
  - Maximum heart rate
  - Percentage of target heart rate attained
  - Estimated maximum metabolic equivalents (Mets)
  - Double product
  - Maximum systolic and diastolic blood pressure
- Max ST data displayed on the Report Manager screen
  - Absolute ST Elevation and ST Depression times and leads
  - Amount of ST Elevation and ST Depression change
  - ST/HR Index

**NOTE** Patients may already have ST elevation or depression before exercise begins. It is important for the clinician to see how much change occurs during exercise.

- Report Notes data displayed on the Report Manager screen
  - Technician
  - Reviewing Physician
  - Reasons for End
  - Symptoms
  - Conclusions

**Figure 3-4 Summary Report - Page 1**

<b>Patient 4 Sample 4</b> <b>04/01/2004 12:49</b> <b>3 MM ST DEP</b>		<b>68 yrs Female</b> <b>Protocol: BRUCE</b>	
<b>Summary</b> Exercise Time: 04:30 Leads with 100uV ST: I, II, III, aVR, aVF, V1, V3, V4, V5, V6 PVC's: 0 Duke Treadmill Score: -6 FAI%: 9/22		<b>Max Values</b> Speed: 2.5 MPH    HR: 93 BPM    % Target: 65% Grade: 12.0%    SBP: 138 mm Hg METS: 7.1    DBP: 88 mm Hg HR*BP: 11178 ST/HR Index: 16.50uV/bpm in V5 at 08:50	
<b>Max ST</b> ST elevation: 2.1 mm in aVR at 05:30 ST depression: -3.1 mm in II at 05:30		<b>Max ST Changes</b> ST elevation change: 1.6 mm in aVR at 05:30 ST depression change: -2.5 mm in V5 at 05:30	
<b>Reasons for End</b> Significant ST change with symptoms		<b>Symptoms</b> Chest Pain Shortness of Breath Jaw Pain	
<b>Conclusions</b> Strongly positive Stress Test. Patient taken to Cardiac Cath Lab for emergent treatment.			
Technician: A. Hannibal		Reviewing Physician: Dr. Elliott French	
St. Mary's Hospital		Philips StressVue V1.0	

On page 2 and any following pages, the Summary Report includes one average beat per lead from:

- Pre-exercise phase
- Peak exercise
- Point of maximum ST depression
- Two minutes into recovery
- Any documented events

Figure 3-5 Summary Report - Page 2

Patient 4 Sample 4				SUMMARY TABLE																
04/01/2004 12:49				ST measurement based on J+60ms																
STAGE SUMMARY							ST LEVEL (mm)													
Speed (MPH)	Grade (%)	HR (BPM)	BP (mm Hg)	METS	HR*BP	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6			
START EXE	EXE 00:00					-0.3	-0.8	-0.5	0.5	0.0	-0.7	0.4	0.1	0.0	-0.4	-0.6	-0.6			
STAGE 1	EXE 03:00	1.7	10.0	81	138/88	4.6	11040	-0.5	-1.3	-0.9	0.8	0.1	-1.1	0.6	0.0	-0.7	-1.0	-1.4	-1.3	
PEAK EXE	EXE 04:30	2.5	12.0	93		7.1		-1.0	-2.6	-1.6	1.7	0.2	-2.1	1.1	0.0	-1.3	-1.9	-2.6	-2.7	
RECOVERY	REC 01:00	0.3	0.0	82		1.2		-1.3	-3.1	-1.9	2.1	0.2	-2.5	1.6	0.1	-1.5	-2.2	-3.1	-2.8	
RECOVERY	REC 02:00	0.3	0.0	75		1.2		-1.1	-2.7	-1.6	1.8	0.2	-2.1	1.4	0.2	-1.0	-1.6	-2.4	-2.4	
RECOVERY	REC 03:00	0.3	0.0	67		1.2		-1.1	-2.5	-1.4	1.7	0.1	-2.0	1.3	0.1	-0.9	-1.5	-2.2	-2.2	
RECOVERY	REC 04:00	0.3	0.0	72		1.2		-0.9	-2.2	-1.3	1.5	0.1	-1.8	1.1	0.0	-1.0	-1.5	-2.1	-2.0	
RECOVERY	REC 05:00	0.3	0.0	66		1.2		-0.8	-1.9	-1.1	1.2	0.1	-1.5	0.9	0.0	-0.9	-1.4	-1.9	-1.7	
RECOVERY	REC 06:00	0.3	0.0	60		1.2		-0.8	-1.6	-0.9	1.1	0.0	-1.3	0.8	-0.1	-1.0	-1.4	-1.8	-1.6	
RECOVERY	REC 07:00	0.3	0.0	62		1.2		-0.8	-1.8	-1.0	1.2	0.0	-1.4	0.9	0.0	-0.8	-1.2	-1.7	-1.6	
RECOVERY	REC 08:00	0.3	0.0	63		1.2		-0.8	-1.8	-1.0	1.2	0.1	-1.4	1.0	0.1	-0.7	-1.2	-1.7	-1.6	
RECOVERY	REC 09:00	0.3	0.0	65		1.2		-0.7	-1.7	-1.0	1.1	0.1	-1.4	0.9	0.2	-0.5	-1.1	-1.6	-1.5	
RECOVERY	REC 10:00	0.3	0.0	68		1.2		-0.7	-1.6	-1.0	1.1	0.1	-1.3	0.9	0.2	-0.4	-1.0	-1.5	-1.4	
RECOVERY	REC 11:00	0.3	0.0	64		1.2		-0.6	-1.7	-1.1	1.0	0.2	-1.4	0.8	0.4	-0.1	-0.9	-1.5	-1.4	
RECOVERY	REC 12:00	0.3	0.0	67		1.2		-0.6	-1.5	-0.9	0.9	0.1	-1.2	0.8	0.3	-0.1	-0.8	-1.2	-1.2	
END REC	REC 12:32	0.3	0.0	63		1.2		-0.5	-1.4	-1.0	0.9	0.2	-1.2	0.7	0.3	-0.1	-0.8	-1.3	-1.2	
MINUTE SUMMARY							ST LEVEL (mm)													
Speed (MPH)	Grade (%)	HR (BPM)	BP (mm Hg)	METS	HR*BP	I	II	III	aVR	aVL	aVF	V1	V2	V3	V4	V5	V6			
EXE 00:00						-0.3	-0.8	-0.5	0.5	0.0	-0.7	0.4	0.1	0.0	-0.4	-0.6	-0.6			
EXE 01:00	1.7	10.0		72		-0.2	-0.6	-0.4	0.3	0.1	-0.5	0.3	0.2	-0.1	-0.5	-0.6	-0.6			
EXE 02:00	1.7	10.0		78		-0.3	-1.0	-0.7	0.6	0.1	-0.8	0.4	0.1	-0.5	-0.9	-1.0	-1.0			
EXE 03:00	1.7	10.0	81	138/88	4.6	11040	-0.5	-1.3	-0.9	0.8	0.1	-1.1	0.6	0.0	-0.7	-1.0	-1.4	-1.3		
EXE 04:00	2.5	12.0	92		7.1		-0.9	-2.2	-1.4	1.5	0.2	-1.8	0.9	0.0	-1.4	-1.9	-2.5	-2.5		
REC 00:30	0.3	0.0	91		1.2		-1.0	-2.6	-1.6	1.7	0.2	-2.1	1.3	0.1	-1.4	-2.0	-2.7	-2.6		
REC 01:30	0.3	0.0	78		1.2		-1.2	-2.9	-1.7	1.9	0.2	-2.3	1.5	0.2	-1.1	-1.8	-2.6	-2.5		
REC 02:30	0.3	0.0	72		1.2		-1.2	-2.8	-1.6	1.9	0.1	-2.2	1.5	0.2	-1.1	-1.8	-2.6	-2.5		
REC 03:30	0.3	0.0	71		1.2		-1.0	-2.2	-1.3	1.5	0.1	-1.8	1.1	0.0	-1.0	-1.5	-2.0	-2.0		
REC 04:30	0.3	0.0	67		1.2		-0.9	-2.2	-1.3	1.5	0.1	-1.7	1.0	0.0	-1.1	-1.7	-2.2	-2.0		
REC 05:30	0.3	0.0	66		1.2		-0.8	-1.7	-1.0	1.1	0.0	-1.3	0.8	-0.1	-1.0	-1.4	-1.8	-1.6		
REC 06:30	0.3	0.0	64		1.2		-0.8	-1.7	-1.0	1.1	0.0	-1.3	0.8	-0.1	-0.9	-1.3	-1.7	-1.6		
REC 07:30	0.3	0.0	64		1.2		-0.8	-1.8	-1.0	1.2	0.0	-1.4	0.9	0.0	-0.7	-1.2	-1.7	-1.6		

St Mary's Hospital

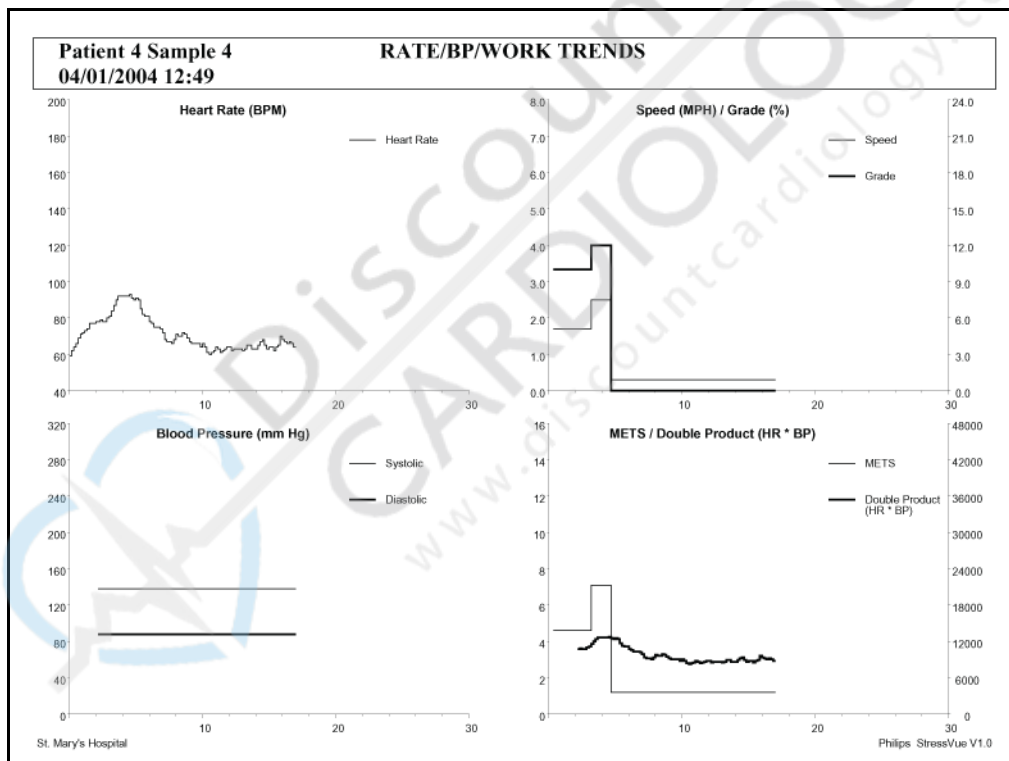
Philips StressVue V1.0

## Trends Report

The Trends Report includes the following trends:

- ST slope for all leads specified in the user profile
- ST level for all leads specified in the user profile
- Heart rate
- Systolic and diastolic blood pressure
- Double product
- Speed/grade
- Metabolic equivalents (Mets)

**Figure 3-6 Trends Report - Page 1**



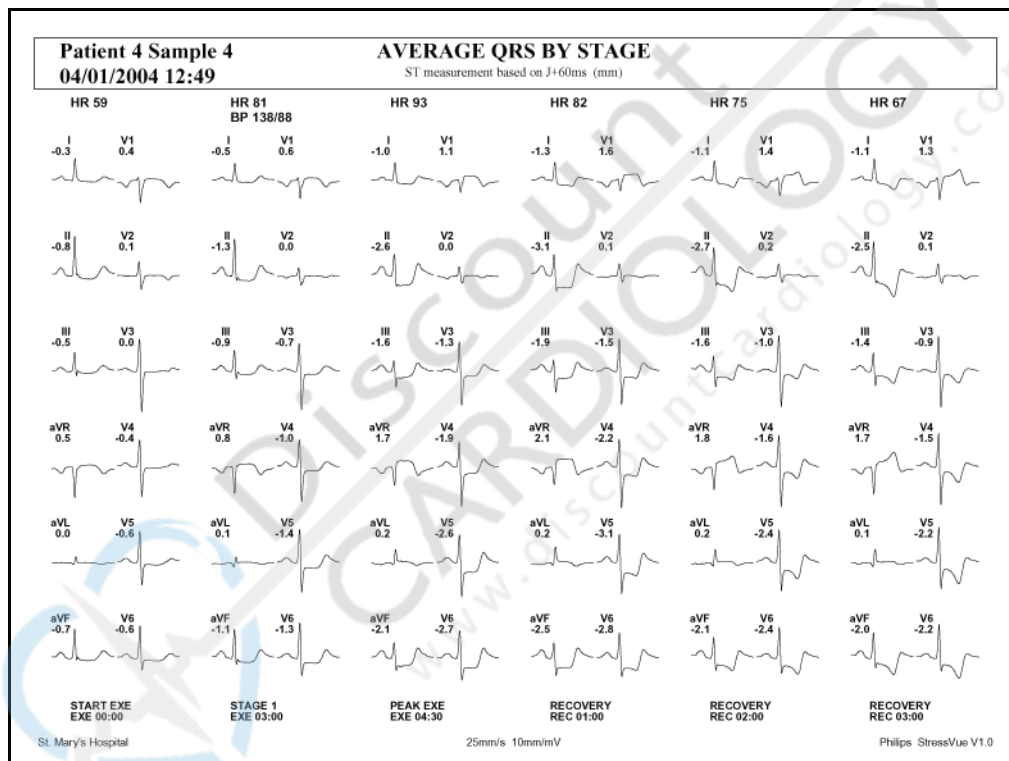
## Average QRS Report

The Average QRS Report includes the following data:

- One average complex per lead for each minute or stage of exercise and recovery
- One average complex per lead for Supine, Standing, and Hyperventilation Pre-Exercise ECGs and Peak Exercise ECG.

In the final report, this report prints both by stage and by minute. When you use Quick Print or you print from the Archive screen, you can choose whether to print the report by stage or by minute.

**Figure 3-7 Average QRS Report - Page 1**



## 12-Lead ECG Report

This report prints 12-Lead ECGs that were automatically generated during the stress test. You specify when in a stage an ECG is automatically generated when you define each stage of the exercise protocol.

**NOTE** There is a difference of one second between the automatically generated ECG printouts from the Exercise phase and the ECG printouts in the Final Report. The waveforms may not match exactly.

The Reference prints as Start Exercise in all 12-Lead ECG printouts in the Final Report, regardless of the settings selected during the exercise portion of the test.

## Rhythm Events Report

The Rhythm Events Report prints a snapshot of all events, captured arrhythmias, and RPE scale selections acquired during the stress test.

You can review, edit, and delete rhythm events prior to printing this section of the report. See “Reviewing Rhythm Events” on page 3-5.

## Printing Reports

Both before and after you save the report, you can print individual reports from the Quick Print area of the Report Manager screen. See “Quick Printing” on page 3-15.

You can print the entire final report only after you save the report.

Default settings for printing are set in the Printout tab of the user profile. You can change these settings at the time you print.

- You can print on either the thermal printer or a laser printer using standard paper.
- If you print to a laser printer, you can click the Grid check box to print a grid on the standard paper.

## Quick Printing

Quick Print allows you to print four of the individual reports before or after you save the final report.

The screenshot shows a 'Quick print' control panel. On the left, there is a dropdown menu currently set to 'Thermal Printer' and a checkbox labeled 'Grid'. Below these is a 'Print Report' button. To the right, there are four buttons: 'Patient Info', 'Trend', 'Average QRS', and 'Summary'. A 'by Minute' dropdown menu is positioned above the 'Average QRS' button.

### To print an individual report using Quick Print

- 1 From the Report Manager screen, select the thermal printer or the laser printer from the dropdown list.
- 2 If you are printing to a laser printer, click **Grid** to print a grid on the standard paper.
- 3 Select the report to print.
  - Click **Patient Info**.
  - Click **Summary**.
  - Click **Trend**.
  - For the Average QRS Report, select by Minute or by Stage, then click **Average QRS**.

## Printing the Final Report

You cannot print the final report until you have saved the report. See “Saving the Final Report” on page 3-9.

The default settings for printing are set in the **Printout** tab of the user profile. You can change these settings from the Report Manager screen at the time you print.

When you print the final report, you can choose which of the individual reports to include and the number of copies to print of each individual report. The Patient Info Report automatically prints as the first page of the final report.

Report copies

1	Summary	0	12-Lead ECG	Thermal Printer
1	Trends	0	Rhythm Events	<input type="checkbox"/> Grid
1	Average QRS			<b>Print Report</b>

### To print the final report

- 1 From the Report Manager, indicate which individual reports to include in the final report:
  - Specify the setting **0** if you do not want to include it in the final report.
  - Specify the setting **1** to include one copy of the associated report in the final report.
  - To print additional copies of any of the individual reports, click the up arrows to set the number of copies to print.
- 2 If necessary, change the printer selection in the dropdown box.
- 3 If you are printing to a laser printer, click **Grid** to print a grid on standard paper.
 

When you print to an HP LaserJet 4200 with no grid, the pages print at approximately 35 ppm. When grid is checked, pages print at 2 ppm.
- 4 Click **Print Report**.

## Working with Archived Reports

StressVue automatically stores the last 100 stress tests, including the final reports and full disclosure data. You can review or edit any stored report, regardless of whether it has been saved. Once you export a report, you can no longer edit it.

Each test uses 1% of the archive space, so the percentage of archive space used equals the number of stored stress tests. When 75 tests are stored and the used archive space reaches 75%, StressVue prompts you to export and delete patient records so you do not run out of archive space.

### To display the Archive screen

- ▶ Click **Archive** in the StressVue Main window.
 

The Archive screen appears, listing all stored reports. A scroll bar appears on the right side when the list is longer than the available space on the screen.

Figure 3-8 Archive Screen

The screenshot shows the Philips Archive Screen. At the top, there is a 'Main Menu' button. Below it, the 'Archive' section displays 'Total exams: 6' and 'Used Archive space: 6%'. A table lists patient information and report details. A blue circle highlights the 'Report' column in the table. At the bottom, there are 'Report options' and 'Batch report options' sections with various buttons and a dropdown menu.

Last Name	First Name	ID	Second ID	DOB	Technician	Rev Physician	Report	Prt	Exp	Exam Date/Time
Sample 1	Patient 1	309655	123-45-6789	10/15/1935	A. Smith	Dr. Edward J. ...	Y	Y	Y	01/30/2004 12:08
Sample 2	Patient 2	289939	987-65-4321	05/10/1941	B. Harvey	Dr. Ann Rich...	Y	Y	Y	01/19/2004 12:13
Sample 3	Patient 3	328836	355-23-5532	12/12/1928	B. Harvey	Dr. D. Dickson	Y	Y	Y	01/05/2004 16:02
Sample 4	Patient 4	388835	432-88-6795	01/09/1943	B. Harvey	Dr. James Fran...	Y	Y	Y	01/05/2004 16:08
Sample 5	Patient 5	355235	775-33-3025	04/22/1963	A. Jones	Dr. James Fran...	Y	Y	Y	01/05/2004 16:12
Smith	John	384527	352-38-9907	01/01/1941	B. Schultz	Dr. James Fran...	Y	Y	Y	06/05/2004 19:11

Report options: View Patient Info (by Stage), Export Exam, View Report, Print Report, Delete Exam.

Batch report options: Exam Reports, Delete exam after export, Print Reports, Export Exams.

### To select a report

- Click the desired report, then select an option at the bottom of the screen.

## Viewing Patient Info

### To view patient information

- Select **View Patient Info** to view or edit information entered in the Patient Info window. If the report has been exported, you can view the patient info, but you cannot edit it. See “Adding or Updating Patient Information” on page 3-4.

## Viewing a Report

### To view a report

- Select **View Report** or double-click a highlighted report to display it on the Report Manager screen.

If the report has been exported, you can view it but not edit it. See “The Report Manager screen” on page 3-2.

## Printing a Report

### To print a report

- ▶ Click the dropdown list to select by **Minute** or by **Stage** for the Average QRS Report, then click **Print Report** to print the final report for the highlighted test.  
StressVue places a **Y** next to this report in the **Prt** column on the Archive screen.

## Exporting a Report (Export Exam)

You can save the final report as a PDF file.

- The PDF format is a high quality, high-resolution file version of the report. It contains the same information that prints when you select Print Report.
- You can no longer edit the report after it is exported. It is marked as read-only and you can only review the data.
- You can still print the report from StressVue at any time. You can also print the PDF file through Adobe Acrobat.
- StressVue places a **Y** next to this report in the **Exp** column on the Archive screen.
- Select **Delete exam after export** to automatically remove the report from StressVue after it is exported to a PDF file. StressVue prompts you to confirm this selection.
- StressVue saves the PDF file in the directory specified in the **Miscellaneous** tab of the user profile. The default directory is **C:\StressVue\Reports**. You can only change this setting in the user profile.
- PDF files are small enough to be used as attachments to e-mails or stored on your StressVue PC or a file server. You can easily move PDF files to another medium, such as a CD, for distribution and storage.

### To export the final report as a PDF file

- 1 Save the final report.
- 2 Click **Export Exam** to save it as a PDF file.

## Deleting a Report (Delete Exam)

You can manually delete a single report or have StressVue automatically delete reports after they are exported as PDF files.

### To delete a report

- 1 Select the report to delete.
- 2 Click **Delete Exam** to permanently remove a highlighted patient record from the archive. See “Viewing Reports Saved as PDF Files” on page 3-20. StressVue displays the message **The selected exam will be erased - do you want to continue?**
- 3 Click **Yes** to delete the record or **No** to cancel.

**To automatically delete exported reports**

- ▶ Select **Delete exam after export** to automatically remove a report from StressVue after it is exported to a PDF file.

StressVue prompts you to confirm this selection. See “Exporting a Report (Export Exam)” on page 3-18.

## Working with Batch Reports

You can process several reports at one time. This is particularly helpful if you do not have time to generate reports after each test.

### Saving Multiple Reports (Exam Reports)

**To save multiple reports**

- 1 Click **Exam Reports** to save all reports that have not yet been saved.  
StressVue displays the Report Manager screen for the first report on the Archive screen that has not yet been saved.
- 2 Make any changes to the test results.
- 3 Click **Save Report**.  
StressVue saves the report, places a **Y** next to it in the **Report** column on the Archive screen, and displays the next report.
- 4 Repeat steps 2 to 3 for each report.

You can continue to edit each report until you export it.

### Printing Multiple Reports (Print Reports)

**To print multiple reports**

- 1 Click **Print Reports** to print all final reports that have not yet been printed.  
StressVue finds the first report on the Archive screen that has not yet been printed and displays it on the Report Manager screen.
- 2 Change the test results as needed.
- 3 Click **Save Report**.  
StressVue saves the report, prints it, places a **Y** next to it in the **Prt** column on the Archive screen, and displays the next report.
- 4 Repeat steps 2 to 3 for each report.

You can still edit or reprint each report by selecting it from the Archive screen. After you export a report, you can still print it, but you cannot edit it.

## Exporting Multiple Reports (Export Exams)

### To export multiple reports

- 1 Click **Export Exams** to export all reports that have not yet been exported.  
StressVue displays the Report Manager screen for the first report on the Archive screen that has not yet been exported.
- 2 Change the report if needed. Remember that you cannot change it after you export it.
- 3 Click **Save Report**.  
StressVue saves the report, exports it, places a **Y** next to it in the **Exp** column on the Archive screen, and displays the next report.
- 4 If you selected **Delete exam after export**, StressVue prompts you to confirm this selection before displaying the next report. If you click **Yes** to confirm, StressVue deletes the report from the archive.
- 5 Repeat steps 2 to 4 for each report.

You can easily move PDF files to another medium, such as a CD, for distribution and storage.

## Viewing Reports Saved as PDF Files

### To view a PDF file

- 1 Exit from the StressVue application.
- 2 From Windows Explorer, locate and select the directory where the file was exported.
- 3 Locate the file you want to review and double-click it.  
Adobe Acrobat Reader automatically opens and displays the file.
- 4 Press **Page Down** and **Page Up** to navigate through the file.
- 5 If StressVue is connected to a printer, you can print the file by selecting **File**, then **Print**.

---

# Maintaining the StressVue System

This chapter describes routine maintenance and cleaning of your StressVue system. It provides the following information:

Routine System Cleaning and Maintenance . . . . .	4-1
Precautions . . . . .	4-1
Cleaning the StressVue System . . . . .	4-2
Cleaning the Printer . . . . .	4-2
Cleaning the Patient Module and Patient Data Cable/Lead Wires . . . . .	4-3
Replacing Batteries in the X-12 Wireless Patient Module . . . . .	4-3

## Routine System Cleaning and Maintenance

### Precautions

- Before cleaning any equipment, unplug the AC power cord connecting the equipment to the power source.
- Do not attempt to clean the device or patient cables by submersing into a liquid, autoclaving, or steam cleaning.
- Wipe the exterior surface of the device and patient cables with a non-alcohol sterilizing disinfectant, and then dry with a clean cloth.
- Conductive parts of the patient cable, electrodes, and associated Type CF connections, including the neutral conductor of the patient cable and electrode, should not come into contact with other conductive parts, including earth ground.
- Do not pull or stretch patient cables as this could result in mechanical and/or electrical failures. Patient cables should be stored after use by forming them into a loose loop.
- Proper patient preparation is important for proper application of ECG electrodes and operation of the device.
- Patient cable exteriors should be checked for cracks or breakage prior to use.

- As defined by IEC 60601-1 and IEC 60601-2-25, the device is classified as follows:
  - Class IIa equipment
  - Type CF applied parts
  - Ordinary equipment
  - Not suitable for use in the presence of flammable anesthetics
  - Continuous operation

---

**CAUTION** Dispose of waste material according to local regulations and laws regarding medical and battery waste.

---

## Cleaning the StressVue System

To clean the system, including PC, monitor, and transport cart

- Clean the mouse every month, as follows:
  - a Remove the ball from the mouse base.
  - b Wipe the ball with a dry cloth.
  - c Reassemble the mouse.
- Clean the keyboard with a damp cloth, as necessary.
- Clean the outside of the computer with a soft cloth lightly moistened with a mild detergent solution. Do not use solvents or abrasive cleaners.
- Clean the display with a soft cloth lightly moistened with a mild detergent approved for use on the display. Do not use solvents or abrasive cleaners.
- Clean the cart with a damp cloth, as necessary.

## Cleaning the Printer

- If the system is configured with a StressVue thermal printer, clean the Z-fold print head every month, as follows:
  - a Open the writer door.
  - b Lightly rub the print head with an alcohol pad.
  - c Wipe with a clean cloth to remove alcohol residue.
  - d Allow the print head to air dry.
  - e Clean the platen by using adhesive tape. Apply the tape and pull it off. Rotate roller and repeat until entire roller is clean.
  - f Clean the cue sensor photo detector.
- If the system is configured with a laser printer, refer to the User Guide provided with the printer for maintenance and cleaning instructions.

## Cleaning the Patient Module and Patient Data Cable/Lead Wires

### To clean the patient module and patient data cable/lead wires

- 1 Dampen a soft cloth with one of the disinfectants or cleaning agents listed below. Clean the patient data cable and lead wires with any of the following:
  - Cidex Ortho Phthaladehyde
  - Cetylcide
  - Vesphene 2 Aqueous Phenolic Germicidal Agent

---

#### CAUTION

#### Do not:

- Use isopropyl alcohol
  - Autoclave the PIM, patient data cable/lead wires, or use ultrasonic cleaners
  - Immerse
  - Use abrasive materials
  - Wet the connectors
- 

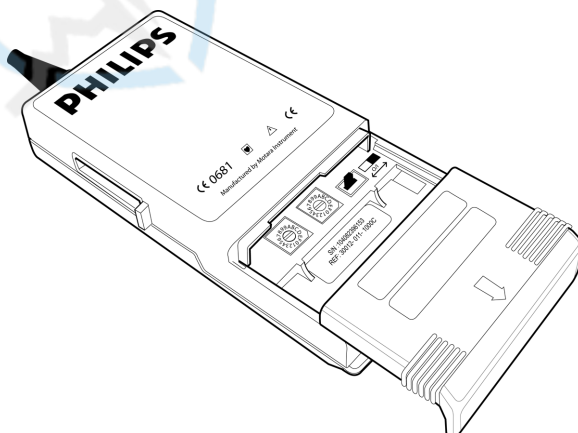
- 2 Wring excess moisture from the cloth before cleaning.

## Replacing Batteries in the X-12 Wireless Patient Module

If you purchased the wireless transmitter option, follow these steps to replace the batteries. Two disposable AA batteries (industrial alkaline) are used to power the X-12 Transmitter. The typical life of two AA batteries is approximately 30 hours.

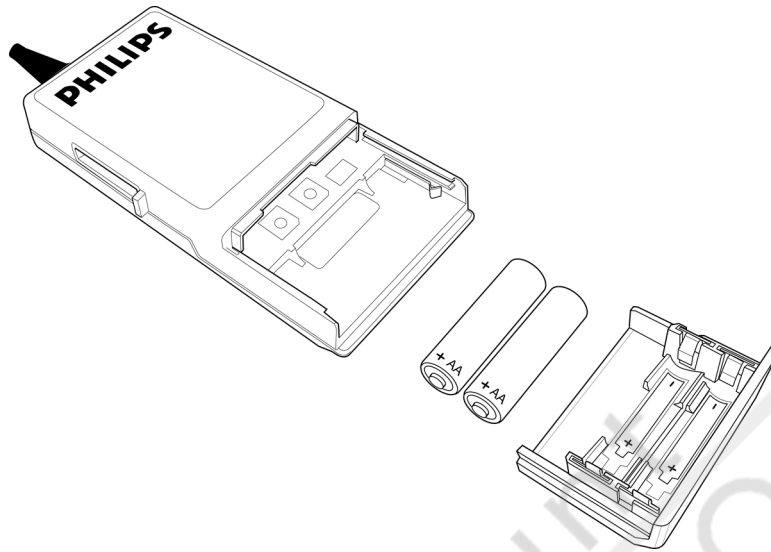
### To install batteries

- 1 Position the X-12 Transmitter with its back facing you.



- 2 Grasp the device with one hand on each side, placing your right and left thumbs on the back's grooved sections of the battery compartment. Then gently push your thumbs down and away to remove the battery compartment.

- 3 Turn the compartment over and insert one new battery in each battery slot.



To be sure of correct placement, align the positive (+) and negative (-) locators of each battery with the respective designator in each battery slot.

- 4 Push the ON/OFF switch, located next to the channel selectors, to the ON position.
- 5 Re-insert the battery compartment.

- NOTES**
- When the X-12 Transmitter is not in use, push the ON/OFF switch to the OFF position.
  - If the batteries are not functioning, or the ON/OFF switch is in the OFF position, the message ON will not appear on the LCD screen, and the leads will not flash on the torso.

## Configuring StressVue

StressVue stores application and test settings in one or more user profiles, defined in the Configuration window.

This chapter provides the following information:

Configuration Overview .....	5-2
Defining and Modifying Profiles .....	5-2
StressVue Configuration Tabs.....	5-3
Creating a Profile .....	5-4
Modifying a Profile.....	5-5
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## Configuration Overview

From the System Configuration window, you can:

- Create and modify user profiles, which include specifications for the equipment, exercise protocol, leads, display, events, and printouts
- Create and modify exercise protocols
- Set up the X-12 wireless transmitter
- Set up other StressVue defaults

The user profile defines parameters for tests such as equipment, RPE scale, display rhythm leads, valid ST leads, report settings, arrhythmia documentation, and final reports.

## Defining and Modifying Profiles

Profiles allow individual clinicians to define preferred test settings, including screen configuration, filters to use, and so on. A profile acts as a template for a given clinician or facility; you can, however, override individual settings for a particular test. These overrides apply only to the current session, however. The settings are reset to those specified in the profile when you exit StressVue.

## StressVue Configuration Tabs

The Configuration window tabs allow you to specify settings for one or more user profiles. The following table provides a brief overview of the tabs.

**Table 5-1 StressVue Configuration window tabs**

Tab	Purpose	For information, see...
<b>Exercise</b>	Use to specify the exercise equipment and the non-invasive blood pressure (NIBP) acquisition mode.	<ul style="list-style-type: none"> <li>■ “Specifying the Equipment” on page 5-14</li> <li>■ “Setting the RPE Scale” on page 5-15</li> </ul>
<b>Leads &amp; Process</b>	Use to specify the lead format you are using and to indicate which leads you want to display on the test screen.	<ul style="list-style-type: none"> <li>■ “Configuring the Leads” on page 5-16</li> <li>■ “Configuring Gain, Filter, and Lead Options” on page 5-17.</li> </ul>
<b>Display</b>	Use to specify display settings used during the test, including the leads to display in the real-time ECG section, the zoomed ECG, and which trends to display.	“Configuring the Display” on page 5-20
<b>Printout</b>	Use to specify print settings, including the print speed and format for ECG reports and continuous rhythm reports. You can also select the printer to use and set the default configuration for the final report.	<ul style="list-style-type: none"> <li>■ “Configuring Print Settings” on page 5-22</li> <li>■ “Configuring Print Settings for Rhythm Events” on page 5-23</li> <li>■ “Specifying the Export Directory” on page 5-26</li> <li>■ “Configuring Print Settings for Events” on page 5-28</li> </ul>
<b>Rhythm Events</b>	Use to specify how rhythm events print, the maximum number of events to print, and the event labels used as identifiers on the printed reports.	“Configuring Events” on page 5-26
<b>Miscellaneous</b>	Use to specify the units format, the date format, and the ST units.	“Setting Unit and Date Formats” on page 5-28



- 4 Complete the fields as needed on the six tabs.

For details about the tabs, see Table 5-1 on page 5-3.

**TIP** Do not click **OK** or **Done**. If you click **OK**, the new profile is created immediately, using defaults for any fields you have not yet completed. You will then have to modify the new profile to finish entering your specifications. If you click **Done**, the new protocol is not saved.

- 5 Click **OK** to save the new profile after entering all your specifications.  
Press **Cancel** if you do not want to save the new profile.
- 6 To use the new profile now, select it in the **Profile Name** field, then click **Set as Current Profile**. If you don't select it, StressVue continue to use the previously selected profile.
- 7 Click **Done** to close the Config window and return to the Main window.

## Modifying a Profile

You can modify any profile on StressVue.

### To modify a profile

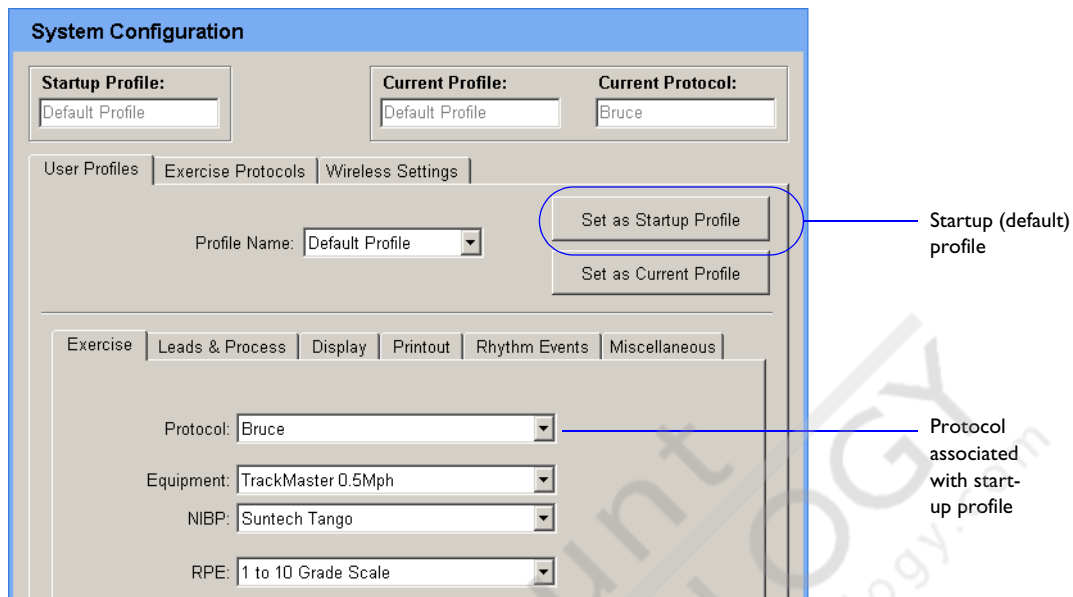
- 1 Click **Config** from the StressVue Main window.  
The User Profile Configuration window appears.
- 2 In **Profile Name**, click the arrow to display the dropdown list and select the profile to modify.  
StressVue displays the **Exercise** tab for the selected profile.
- 3 Change the settings on any of the tabs, as needed.
- 4 Click **Save Profile**.  
You are prompted to save your changes; click **Yes** to overwrite the existing profile settings.
- 5 To use the modified profile now, select it in the **Profile Name** field.  
If you do not select it, StressVue continues to use the previously selected profile.
- 6 Click **Done** to close the Config window and return to the Main window.

## Setting the Startup Profile

When you start up StressVue, it loads the profile defined as the *Startup profile* in the Configuration settings. The settings specified in the startup profile, including the exercise protocol, are loaded automatically.

**NOTE** The startup profile is not necessarily named *Default Profile*; the StressVue software, by default, sets the startup profile to the *Default Profile* entry. You can set any profile as the startup profile.

Figure 5-2 Startup profile and protocol



### To set the startup profile

- 1 Click **Config** from the StressVue Main window.  
The User Profile Configuration window appears.
- 2 In Profile Name, click the arrow to display the dropdown list and select a profile.
- 3 Click **Set as Startup Profile**.
- 4 Click **Done**.  
StressVue returns to the Main window. The next time you start up StressVue, this startup profile will be loaded automatically.

**NOTE** The startup profile is *not* loaded when you return to the Main window. StressVue does not automatically load it until the next time you exit from StressVue and start up again. To load it now, select it as the current profile in the Configuration screen or select both the profile and protocol on the Main window.

## Setting the Current Profile

You can select a specific profile to use for the next stress test. This protocol remains selected until you select another profile or until you exit StressVue. When you start StressVue again, the Startup Profile is loaded.

You can set the profile (and/or protocol) to use after you have started a new patient session by following the steps described next. This allows you to select a new profile and/or protocol without having to abort a test.

**To set the current profile**

- 1 Click **Config** in the StressVue Main window.  
The User Profile Configuration window appears.
- 2 In Profile Name, click the arrow and select the desired profile from the list.
- 3 Click **Set as Current Profile**.
- 4 Click **Done**.  
StressVue returns to the Main window and loads the selected profile and the protocol associated with that profile.

**Deleting a Profile**

You can delete a profile at any time. The profile is deleted from StressVue permanently.

**To delete a profile**

- 1 In Profile Name, click the arrow and select the profile to delete from the list.
- 2 Click **Delete Profile**.
- 3 At the confirmation prompt, click **Yes**.  
The profile is deleted.

**Defining and Modifying Protocols**

Many different protocols are used for clinical exercise testing. All protocols include an initial low load warm-up (Pre-exercise phase), progressive uninterrupted exercise with increasing loads and an adequate time interval in each level (Exercise phase), and a recovery period (Recovery phase).

StressVue ships with the following standard protocols: Bruce, Modified Bruce, Naughton, Ellestad, Balke, Pharmacological, and Bicycle. For a snapshot of each protocol, see Appendix B, "Protocol Reference." You can modify these protocols, or add new ones, as described here.

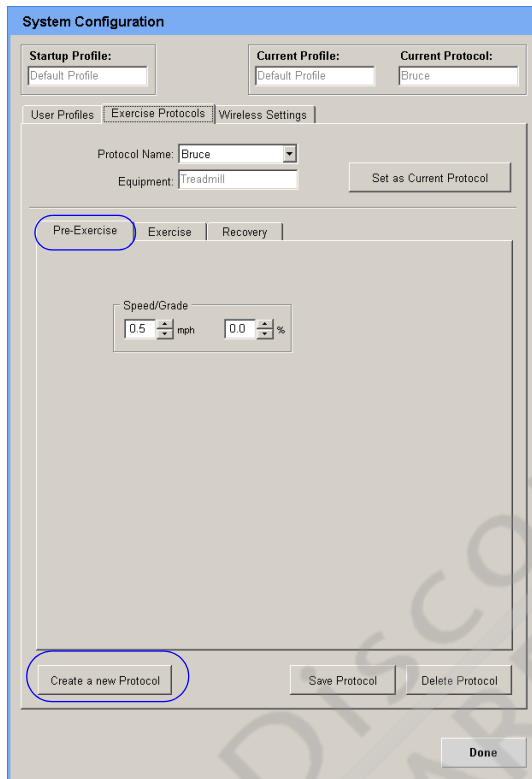
**Creating a Protocol**

Clinicians may choose to create protocols with their preferred exercise settings. Creating a protocol requires you to complete three protocol configuration windows, one for each exercise phase of the stress test.

## Defining the Protocol – Pre-exercise Phase

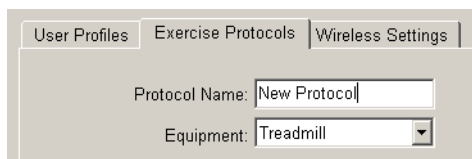
Begin by specifying the settings on the Pre-exercise Phase Protocol Configuration window.

**Figure 5-3 Pre-exercise Phase Protocol Configuration window**



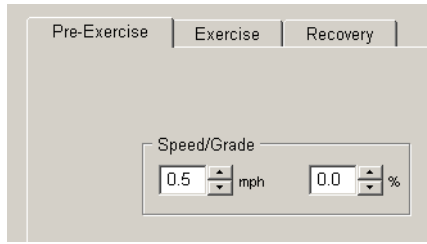
### To define the pre-exercise phase configuration

- 1 Click **Config** from the StressVue Main window.  
The User Profile Exercise Configuration window appears.
- 2 Click **Exercise Protocols**.  
StressVue displays the Pre-exercise Phase Protocol Configuration window for the current protocol.
- 3 Click **Create a new Protocol**.
- 4 Type the Protocol Name, then press **Tab** or click Equipment to move to the next field.



- From the dropdown list, select the model of Treadmill or Ergometer you are using with this protocol.

The appropriate pre-exercise definition fields are displayed.



- Use the arrow keys to specify the Speed and Grade for a treadmill or the Power level for an ergometer.

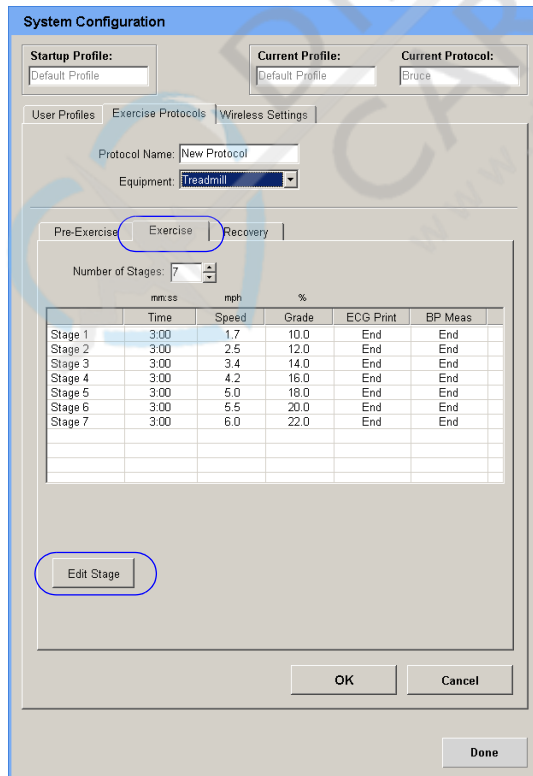
**TIP** Do not click **OK** or **Done**. If you click **OK**, the new protocol is created now, using the current defaults for the exercises and recovery phases. If you click **Done**, the new protocol is not saved.

Continue with “Defining the Protocol – Exercise Phase,” next.

### Defining the Protocol – Exercise Phase

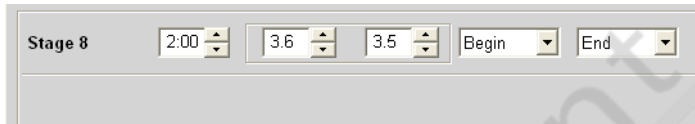
Next, complete the Exercise Phase Protocol Configuration window.

**Figure 5-4** Exercise Phase Protocol Configuration window



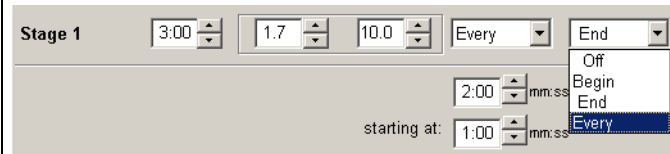
**To define the exercise phase configuration**

- 1 Click the Exercise tab.  
StressVue displays the Exercise Phase Protocol Configuration window, showing the stages for the current protocol.
- 2 Use the arrow keys in the Number of Stages field to define the new protocol by adjusting the number of stages included in the exercise portion of the stress test.  
StressVue adds lines at the bottom of the stage list if you are adding new stages or deletes lines at the bottom of the list if you are removing stages.
- 3 To adjust a specific stage, either double-click it or highlight the line and press **Edit Stage**.  
The stage definition appears at the bottom of the screen so you can edit it.



- 4 Edit the stage definition as needed. Each field in the definition is aligned beneath the appropriate column header.

Field	What to do
Time	Use the arrows to set the duration of the stage.
Speed	Use the arrows to set the speed for the stage.
Grade	Use the arrows to set the grade for the stage.
ECG Print	<p>From the dropdown list, specify how often to print an ECG during the stage.</p> <p><b>Off</b> - No ECG is taken.</p> <p><b>Begin</b> - Take the ECG at the beginning of the stage.</p> <p><b>End</b> - Begin taking the ECG 12 seconds before the end of the stage.</p> <p><b>Every</b> - Two additional fields are displayed. Use the arrows to specify the time interval between ECGs in minutes and seconds, and specify the time of the first ECG print in the starting at field.</p>



Field	What to do
BP Meas	<p>From the dropdown list, specify how often to acquire a blood pressure reading during the stage.</p> <p><b>Off</b> - No measurement is taken.</p> <p><b>Begin</b> - Take the blood pressure at the beginning of the stage.</p> <p><b>End</b> - StressVue prompts you to begin taking the blood pressure one minute before the end of the stage. If you are using the Tango, it begins taking an automatic reading one minute before the end of the stage.</p> <p><b>Every</b> - Two additional fields are displayed. Use the arrows to specify the time interval between blood pressure measurements in minutes and seconds, and specify the time of the first blood pressure measurement in the starting at field.</p>

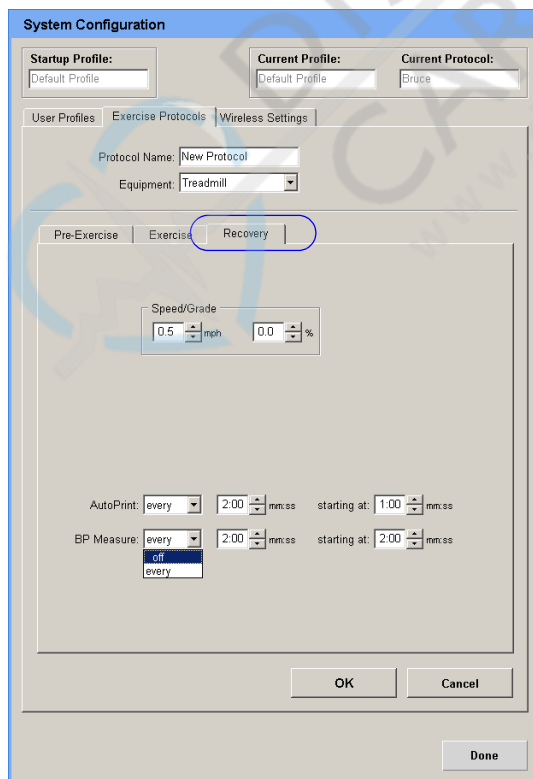
**TIP** Do not click **OK** or **Done**. If you click **OK**, the new protocol is created now, using the current defaults for the recovery phase. If you click **Done**, the new protocol is not saved.

Continue with “Defining the Protocol – Recovery Phase,” next.

### Defining the Protocol – Recovery Phase

Next, complete the Recovery Phase Protocol Configuration window.

**Figure 5-5 Recovery Phase Protocol Configuration window**



**To define the recovery phase configuration**

- 1 Click the Recovery tab.  
StressVue displays the Recovery Phase Protocol Configuration window.
- 2 Use the arrow keys to specify the Speed and Grade for a treadmill or the Power level for an ergometer.
- 3 In the Autoprint field, specify how often to print an ECG during the phase.
  - **Off** - No ECG is taken.
  - **Every** - Use the arrows to specify the time interval between ECGs in minutes and seconds, and specify the time of the first ECG print in the starting at field.
- 4 In the BP Measure field, specify how often to acquire a blood pressure reading during the phase.
  - **Off** - No measurement is taken.
  - **Every** - Use the arrows to specify the time interval between blood pressure measurements in minutes and seconds, and specify the time of the first blood pressure measurement in the starting at field.

If StressVue does not receive the blood pressure measurement within one minute, the measurement will not appear on the ECG printout. In this case, StressVue will then change all time intervals (including stage times) that are set to less than one minute and reset them to one minute.
- 5 Click **OK** to save the new protocol.  
Press **Cancel** if you do not want to save the new protocol.
- 6 To use the new protocol now, select it in the Protocol Name field. If you don't select it, StressVue continues to use the previously selected protocol.
- 7 Click **Done** to close the Config window and return to the Main window.

**Modifying a Protocol**

You can modify any protocol on StressVue.

**To modify a protocol**

- 1 Click **Config** from the StressVue Main window.  
The User Profile Exercise Configuration window appears.
- 2 Click **Exercise Protocols**.
- 3 In Protocol Name, click the arrow to display the dropdown list and select the protocol to modify.  
StressVue displays the Pre-exercise Phase Protocol Configuration window for the selected protocol.
- 4 Make any changes to the pre-exercise phase protocol. See “Defining the Protocol – Pre-exercise Phase” on page 5-8.

- 5 Click the **Exercise** tab.  
StressVue displays the Exercise Phase Protocol Configuration window.
- 6 Make any changes to the exercise phase protocol. See “Defining the Protocol – Exercise Phase”.
- 7 Click the **Recovery** tab.  
StressVue displays the Recovery Phase Protocol Configuration window.
- 8 Make any changes to the recovery phase protocol. See “Defining the Protocol – Recovery Phase” on page 5-11.
- 9 Click **Save Protocol**.
- 10 To use the modified protocol now, select it in the Protocol Name field. If you don’t select it, StressVue continue uses the previously selected protocol.
- 11 Click **Done** to close the Config window and return to the Main window.

## Setting the Current Protocol

You can select a specific protocol to use for the next stress test. This protocol remains selected until you select another protocol or until you exit StressVue. When you start StressVue again, the Startup Profile is loaded, including the protocol specified in the Startup Profile.

### To set the current protocol

- 1 Click **Config** from the StressVue Main window.  
The User Profile Exercise Configuration window appears.
- 2 Click **Exercise Protocols**.  
StressVue displays the Pre-exercise Phase Protocol Configuration window for the current protocol.
- 3 In Protocol Name, click the arrow to display the dropdown list and select a protocol.
- 4 Click **Set as Current Protocol**.
- 5 Click **Done**.  
StressVue returns to the Main window and loads the selected protocol.

## Deleting a Protocol

You can delete any protocol at any time. The protocol is deleted from StressVue permanently.

### To delete a protocol

- 1 Click **Config** from the StressVue Main window.  
The User Profile Exercise Configuration window appears.
- 2 Click **Exercise Protocols**.  
StressVue displays the Pre-exercise Phase Protocol Configuration window for the current protocol.

- 3 In Protocol Name, click the arrow to display the dropdown list and select a protocol.
- 4 Click **Delete Protocol**.
- 5 At the confirmation prompt, click **Yes**.  
The protocol is deleted.

## Specifying the Equipment

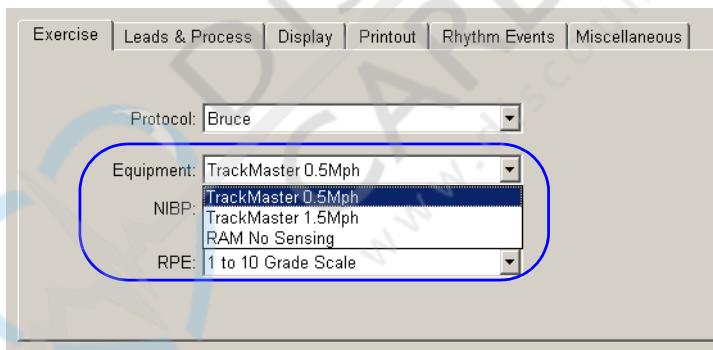
When you are defining or modifying a profile, use the **Exercise** tab of the User Profile Configuration window to specify the exercise equipment and the non-invasive blood pressure (NIBP) acquisition mode.

### Specifying the Treadmill or Ergometer

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

#### To specify the exercise equipment

- 1 Display the Exercise tab.
- 2 Click the dropdown arrow in the Equipment field to select the exercise equipment for the profile.



- 3 Click **Save Profile**.

## Setting NIBP Equipment

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

### To specify the blood pressure acquisition mode

- 1 Display the Exercise tab.
- 2 Click the dropdown arrow in the NIBP field to select the non-invasive blood pressure (NIBP) acquisition mode.

The screenshot shows the 'Exercise' tab of the User Profile Configuration window. The 'Protocol' is set to 'Bruce' and 'Equipment' is 'TrackMaster 0.5Mph'. The 'NIBP' dropdown menu is open, displaying a list of options: 'Suntech Tango', 'Manual Mode', 'Suntech Tango', and 'Portapres'. The 'Suntech Tango' option is highlighted in blue, indicating it is the selected mode.

- 3 Click **Save Profile**.

## Setting the RPE Scale

When you are defining or modifying a profile, use the Exercise tab of the User Profile Configuration window to specify the scale used to evaluate the patient’s Rate of Perceived Exertion (RPE). You can choose between a scale from 1 to 10 or a scale from 6 to 20 (corresponding to the Borg scale).

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

### To specify the RPE scale

- 1 Display the Exercise tab.
- 2 Click the dropdown arrow in the RPE field to select the scale to use.

The screenshot shows the 'Exercise' tab of the User Profile Configuration window. The 'Protocol' is 'Bruce', 'Equipment' is 'TrackMaster 0.5Mph', and 'NIBP' is 'Suntech Tango'. The 'RPE' dropdown menu is open, displaying a list of options: '1 to 10 Grade Scale', '1 to 10 Grade Scale', and '6 to 20 Grade Scale'. The first '1 to 10 Grade Scale' option is highlighted in blue, indicating it is the selected scale.

- 3 Click **Save Profile**.

## Configuring the Leads

When you are defining or modifying a profile, use the Leads & Process tab of the User Profile Configuration window to specify the lead format you are using and to indicate which leads you want to display on the test screen.

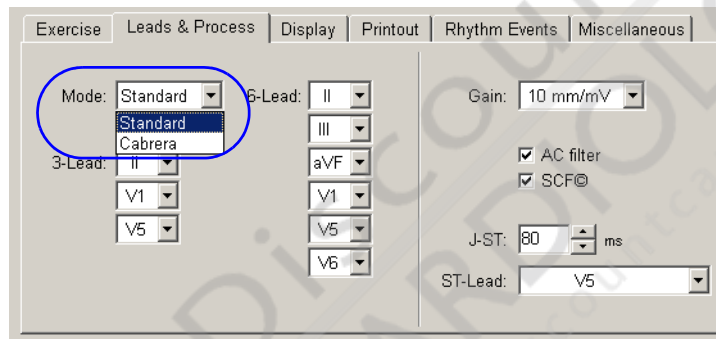
### Specifying the Lead Format (Mode)

You must specify whether you are using Standard or Cabrera leads.

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

#### To specify the lead format

- 1 Display the Leads & Process tab.
- 2 Click the dropdown arrow in the Mode field to select either Standard or Cabrera leads.



- 3 Click **Save Profile**.

### Selecting Leads to Display

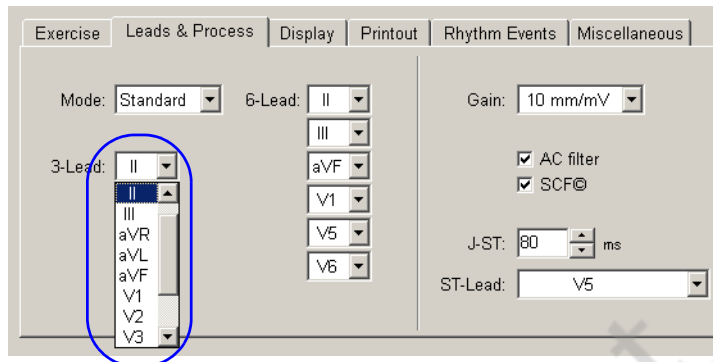
You can choose:

- The three leads to be displayed on screen when the 3-lead display is chosen. This setting also determines which three rhythm leads are included on an ECG report.
- The six leads to be displayed on screen when the 6-lead display is chosen

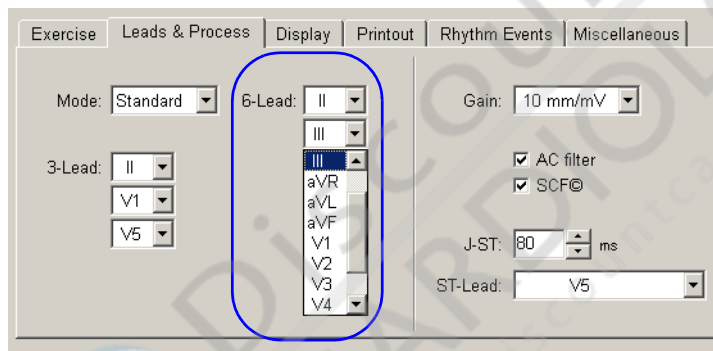
See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

**To specify the leads to display on screen**

- 1 Display the Leads & Process tab.
- 2 In the 3-Lead fields, click the dropdown arrows and select a lead from each list.



- 3 In the 6-Lead fields, click the dropdown arrows and select a lead from each list.



- 4 Click **Save Profile**.

## Configuring Gain, Filter, and Lead Options

When you are defining or modifying a profile, use the Leads & Process tab of the User Profile Configuration window to specify the gain or amplitude for the on-screen ECG display, the filters you are using, the J-ST setting, and the default ST lead.

### Selecting the Gain

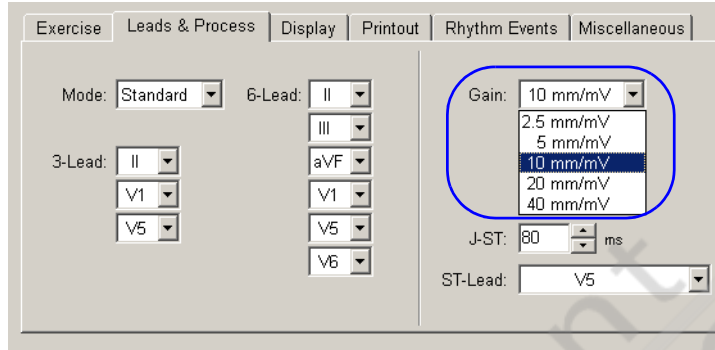
Specify the amount of gain or amplitude for the on-screen ECG display, 12-lead printout, and continuous rhythm strip.

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

**To select the gain**

- 1 Display the Leads & Process tab.
- 2 Click the dropdown arrow in the Gain field and select the setting.

The choices are 2.5 mm/mV, 5 mm/mV, 10 mm/mV, 20 mm/mV and 40 mm/mV. The default is 10 mm/mV.



- 3 Click **Save Profile**.

**Setting the Filters**

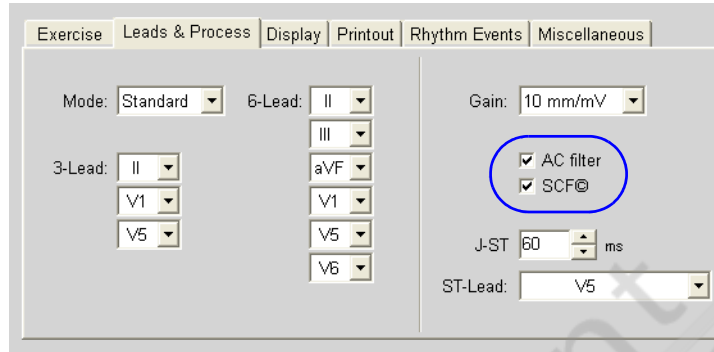
Filters may be used for ECGs that would otherwise be unreadable due to excessive amounts of noise and artifact. In the profile, you can enable or disable the AC line filter and the Source Consistency Filter (SCF).

- The AC filter removes line frequency noise by removing frequencies in a narrow band around 60 Hz (domestic) or 50 Hz (international).
- The Source Consistency Filter (SCF), patented by Mortara Instrument, is an exclusive feature used for reducing noise associated with stress testing. Using the morphology learned during the Pre-exercise phase or during a Relearn operation (page 2-30), the SCF distinguishes between noise and the actual signal in each lead. This filtering reduces muscle tremor noise, low frequency and high-frequency noise, and baseline artifact, while **preserving diagnostic-quality waveforms**.

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

**To set the filters**

- 1 Display the Leads & Process tab.
- 2 Select the AC filter check box to make the filter active.
- 3 Select the SCF<sup>®</sup> check box to make the filter active.



- 4 Click **Save Profile**.

**Selecting the ST Settings**

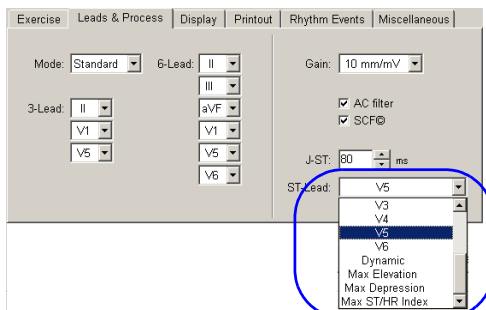
You can select defaults for the following ST settings.

- The J-ST setting specifies the number of milliseconds after the J-point that the ST value is measured.
- The default ST lead is shown in the zoomed QRS window during the stress test. Select Dynamic if you want StressVue to display the lead with the most significant ST changes.

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

**To select the J-ST setting and the ST-Lead**

- 1 Display the Leads & Process tab.
- 2 Use the arrow keys to specify the J-ST setting in milliseconds.
- 3 In the ST-Lead field, click the dropdown arrow and select the lead to display as the Zoomed ECG during a stress test. You can select:
  - Any lead
  - Dynamic, Max Elevation, Max Depression, Max ST/HR Index



- 4 To display the selected ST Lead as the Zoomed ECG, click the Display tab.
- 5 Select the Zoom ST Lead check box.
- 6 Click **Save Profile**.

## Configuring the Display

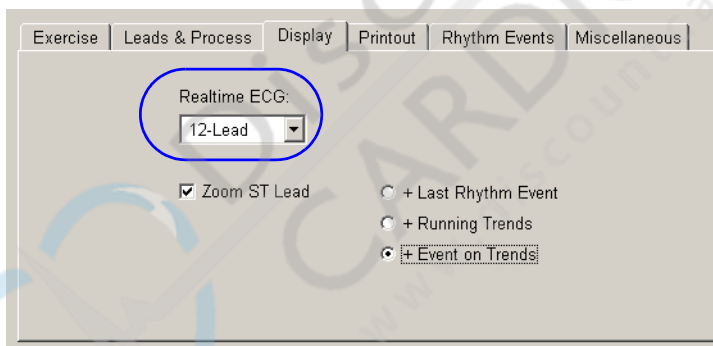
You can set up the default screen display used during the test, including the real-time ECG, the zoomed ECG, and the trends display.

### Configuring the Real-time Display

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

#### To set number of leads in the real-time ECG display

- 1 Display the Display tab.
- 2 Click the dropdown arrow in the Realtime ECG field and select from 3-Lead, 6-Lead, 6x2-Lead, or 12-Lead.



- 3 Click **Save Profile**.

### Configuring the Zoom Display

See “Selecting the ST Settings” on page 5-19.

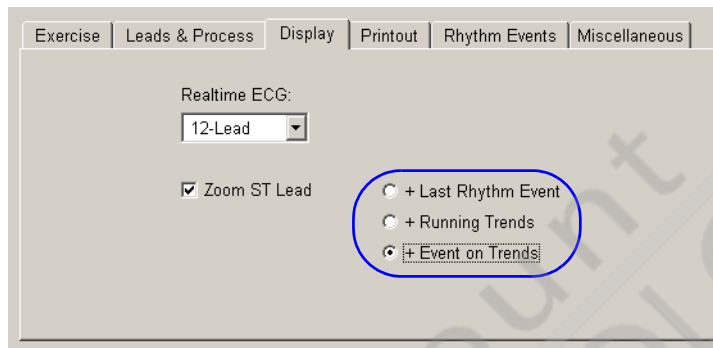
### Configuring the Trends Display

If you have selected the Zoom ST Lead check box on the Display tab, then you can also configure the Trends display. This appears below the Zoomed ECG on the test screen.

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

**To choose the trends display**

- 1 Display the Display tab.
- 2 Set the default display option.
  - + Last Rhythm Event displays the last rhythm event
  - + Running Trends displays running trends of the HR, ST level, and Mets
  - + Event On Trends displays running trends of the HR, ST level, and Mets, and displays the last rhythm event over the running trends for a period of 10 seconds



- 3 Click **Save Profile**.

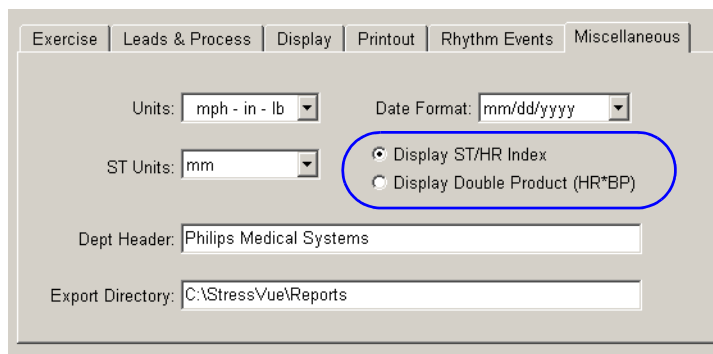
**Displaying the ST/HR Index or Double Product**

You can set the default for which value to display on the Data Panel during a test: the ST/HR Index or the Double Product (HR\*BP). The Double Product displays the current value, not the maximum value.

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

**To select whether to display the ST/HR Index or the Double Product**

- 1 Display the Miscellaneous tab.
- 2 Select either Display ST/HR Index or Display Double Product (HR\*BP).



- 3 Click **Save Profile**.

## Configuring Print Settings

You can set various print settings, including the print speed and format for ECG reports and continuous rhythm reports. You can also select the printer to use and set the default configuration for the final report.

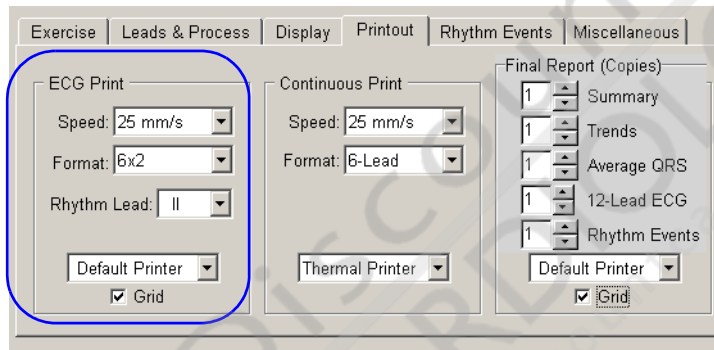
### Configuring Print Settings for ECGs

Select the default print speed, format, rhythm lead, and printer for the printed ECG reports.

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

#### To set the speed, format, and rhythm lead for the ECG report

- 1 Display the Printout tab.



- 2 Click the arrow next to the ECG Print Speed field and choose either 25 mm/s (standard print speed) or 50 mm/s.
- 3 Click the arrow next to the ECG Print Format field to determine the layout of the 12 leads and whether rhythm leads will be included on the printout or not. Choices are:
  - 6x2 (no rhythm leads)
  - 3x4 (no rhythm leads)
  - 3x4+1 (one rhythm lead)
  - 3x4+3 (three rhythm leads)
- 4 Click the arrow next to the Rhythm Lead field and select one of the 12 leads to print along with the ECG.
- 5 Click the arrow at the bottom to select the printer you will use. You can select the Thermal Printer or your laser printer.
- 6 If you select the laser printer, you can click the Grid check box to print a grid on standard paper.
- 7 Click **Save Profile**.

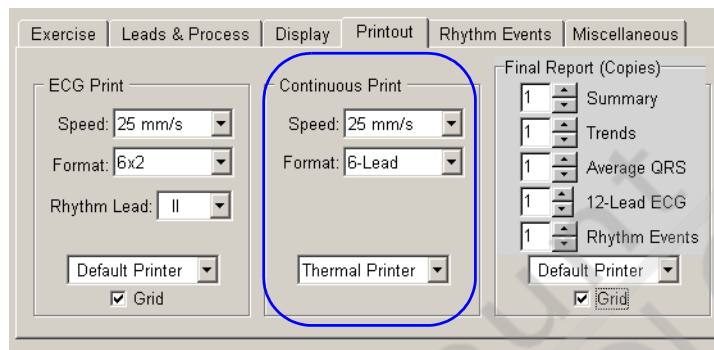
## Configuring Print Settings for Continuous Rhythm Reports

Select the default print speed, format, and printer for continuous rhythm reports.

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

### To set the speed and format for the continuous rhythm report

- 1 Display the Printout tab.



- 2 Click the arrow next to the Continuous Print Speed field and choose either 25 mm/s (standard print speed) or 50 mm/s.
- 3 Click the arrow next to the Continuous Print Format field and choose either 3-Lead or 6-Lead format for the printout.
- 4 Click the arrow at the bottom to select the printer you will use. You can select the Thermal Printer or your laser printer.
- 5 If you select the laser printer, you can click the Grid check box to print a grid on standard paper.
- 6 Click **Save Profile**.

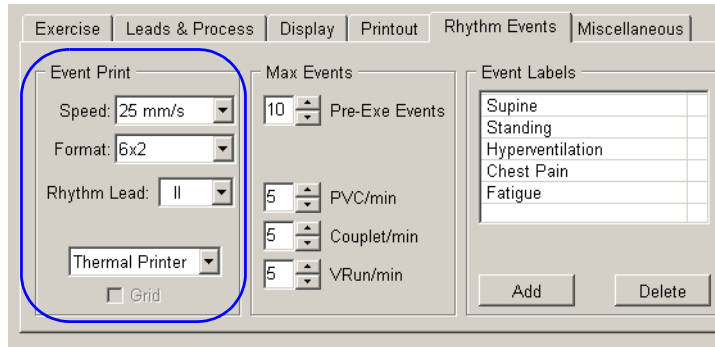
## Configuring Print Settings for Rhythm Events

Select the default print speed, format, rhythm lead, and printer for rhythm events.

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

**To set the speed, format, and rhythm lead for the rhythm events**

- 1 Display the Rhythm Events tab.



- 2 Click the arrow next to the Event Print Speed field and choose either 25 mm/s (standard print speed) or 50 mm/s.
- 3 Click the arrow next to the Event Print Format field to determines the layout of the 12 leads and whether rhythm leads will be included on the printout or not. Choices are:
  - 6x2 (no rhythm leads)
  - 3x4 (no rhythm leads)
  - 3x4+1 (one rhythm lead)
  - 3x4+3 (three rhythm leads)
- 4 Click the arrow next to the Rhythm Lead field and select one of the 12 leads to print along with the ECG.
- 5 Click the arrow at the bottom to select the printer you will use. You can select the Thermal Printer or your laser printer.
- 6 If you select the laser printer, you can click the Grid check box to print a grid on standard paper.
- 7 Click **Save Profile**.

**Configuring Print Settings for the Final Report**

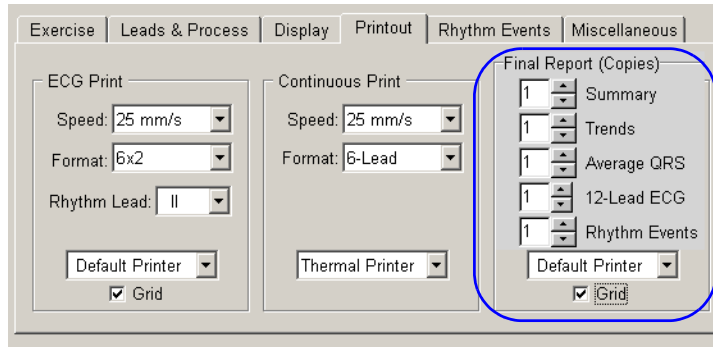
You can choose which of the individual StressVue reports are automatically included when you print the final report. See Chapter 3, “Working with Reports.” You can also select the number of copies to print of each individual report. You can change any of these settings from the Report Manager screen at the time you print.

You can also specify a department identifier to print on the lower left of every page of the reports.

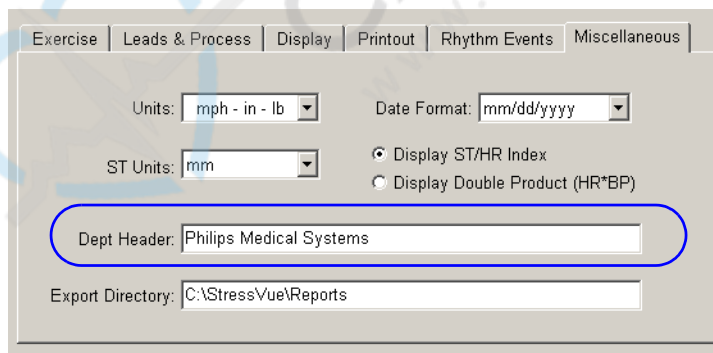
See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

## To configure print setting for the final report

- 1 Display the Printout tab.



- 2 Click the arrow to indicate which individual reports to include in the final report:
  - Select 0 if you do not want to include the individual report in the final report.
  - Select 1 to include one copy of the individual report in the final report.
  - To print additional copies of any of the individual reports, click the up arrows to set the number of copies to print.
- 3 Click the arrow at the bottom to select the printer you will use. You can select the Thermal Printer or your laser printer.
- 4 If you select the laser printer, you can click the Grid check box to print a grid on standard paper.
- 5 To specify a department identifier to print on every page of the report, display the Miscellaneous tab.



- 6 In the Dept Header field, type an identifier.  
This identifier prints in the lower left corner of every page of the report.
- 7 Click **Save Profile**.

## Specifying the Export Directory

When you export a patient report, StressVue creates a PDF file of the report, following all the settings for the Final report. See “Configuring Print Settings for the Final Report” on page 5-24. You must specify the directory where the exported reports will be saved.

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

### To specify the export directory

- 1 Display the Miscellaneous tab.

The screenshot shows the 'Miscellaneous' tab of the StressVue configuration window. The 'Export Directory' field is highlighted with a blue oval and contains the text 'C:\StressVue\Reports'. Other visible fields include 'Units' (mph - in - lb), 'Date Format' (mm/dd/yyyy), 'ST Units' (mm), 'Dept Header' (Philips Medical Systems), and two radio buttons for 'Display ST/HR Index' (selected) and 'Display Double Product (HR\*BP)'.

- 2 Type the full path to the directory where you want to save the exported reports in PDF format.
- 3 Click **Save Profile**.

## Configuring Events

You can set up the defaults to specify how rhythm events print, the maximum number of events to print, and the event labels used as identifiers on the printouts.

### Setting the Maximum Number of Events to Print

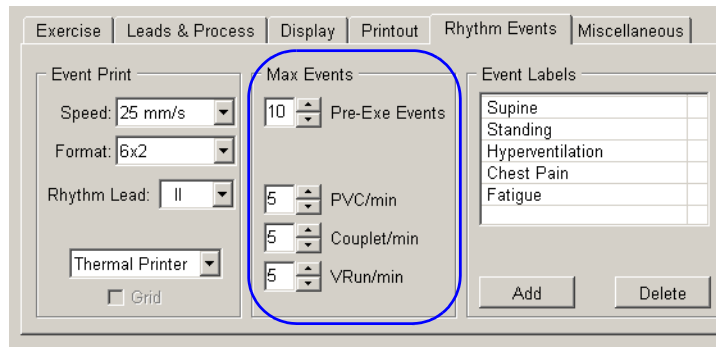
You can specify the maximum number of:

- Events to print during the Pre-exercise phase
- PVC events to print per minute
- Couplet events to print per minute
- Ventricular run events to print per minute

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

### To set the maximum number of events to print

- 1 Display the Rhythm Events tab.



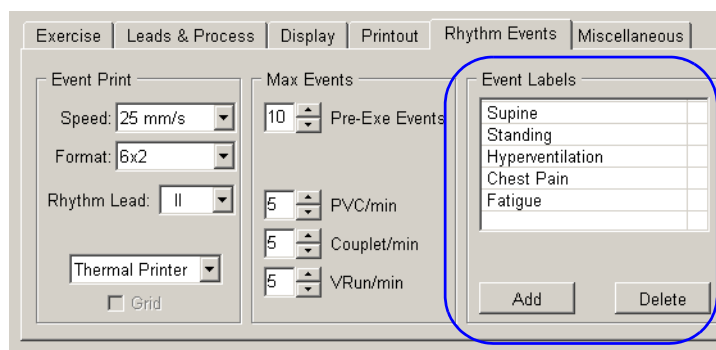
- 2 For Pre-Exe Events, use the arrow keys to specify the maximum number of rhythm events to print during the Pre-exercise phase.
- 3 For PVC/min, use the arrow keys to specify the maximum number of PVC events to print per minute during the test.
- 4 For Couplet/min, use the arrow keys to specify the maximum number of Couplet events to print per minute during the test.
- 5 For VRun/min, use the arrow keys to specify the maximum number of Ventricular Run events to print per minute during the test.
- 6 Click **Save Profile**.

### Adding and Deleting Event Labels

You can add or delete event labels from the list of events that appears when you click **Event** from the test screen. The Supine, Standing, and Hyperventilation event labels cannot be deleted. See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

#### To add an event label

- 1 Display the Rhythm Events tab.



- 2 Click **Add** to create a new label.
- 3 Type the text for the new label and click **OK**.
- 4 Click **Save Profile**.

**To delete an event label**

- 1 Display the Rhythm Events tab.
- 2 Highlight the label to be deleted.
- 3 Click **Delete**, then click **OK** at the confirmation prompt.
- 4 Click **Save Profile**.

## Configuring Print Settings for Events

See “Configuring Print Settings for Rhythm Events” on page 5-23.

## Setting Unit and Date Formats

Set the units format, the date format, and the ST units.

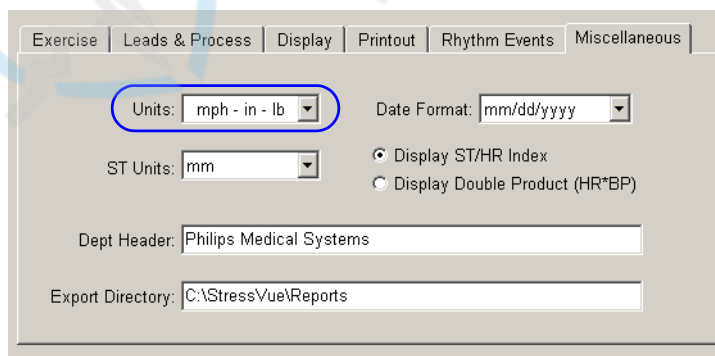
### Setting the Units Format

You can set the units of measure used for speed, patient height, and patient weight.

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

**To set the units**

- 1 Display the Miscellaneous tab.



- 2 Click the dropdown arrow and select one of the formats: mph-in-lb or km-cm-kg.
- 3 Click **Save Profile**.

## Setting the Date Format

You can set the date format to read month before day or day before month.

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

### To set the date format

- 1 Display the Miscellaneous tab.

The screenshot shows the 'Miscellaneous' tab of the User Profile Configuration window. The 'Date Format' dropdown menu is highlighted with a blue circle and currently displays 'mm/dd/yyyy'. Other visible fields include 'Units' (mph - in - lb), 'ST Units' (mm), 'Dept Header' (Philips Medical Systems), and 'Export Directory' (C:\StressVue\Reports). There are also radio buttons for 'Display ST/HR Index' (selected) and 'Display Double Product (HR\*BP)'.

- 2 Click the dropdown arrow and select one of the formats: mm/dd/yyyy or dd/mm/yyyy.
- 3 Click **Save Profile**.

## Setting the ST Units

You can set the units of measure for the ST values.

See “Defining and Modifying Profiles” on page 5-2 for instructions on displaying the User Profile Configuration window.

### To set the ST units

- 1 Display the Miscellaneous tab.

The screenshot shows the 'Miscellaneous' tab of the User Profile Configuration window. The 'ST Units' dropdown menu is highlighted with a blue circle and currently displays 'mm'. Other visible fields include 'Units' (mph - in - lb), 'Date Format' (mm/dd/yyyy), 'Dept Header' (Philips Medical Systems), and 'Export Directory' (C:\StressVue\Reports). There are also radio buttons for 'Display ST/HR Index' (selected) and 'Display Double Product (HR\*BP)'.

- 2 Click the dropdown arrow and select one of the formats: uV or mm.
- 3 Click **Save Profile**.

## Configuring Wireless Mode

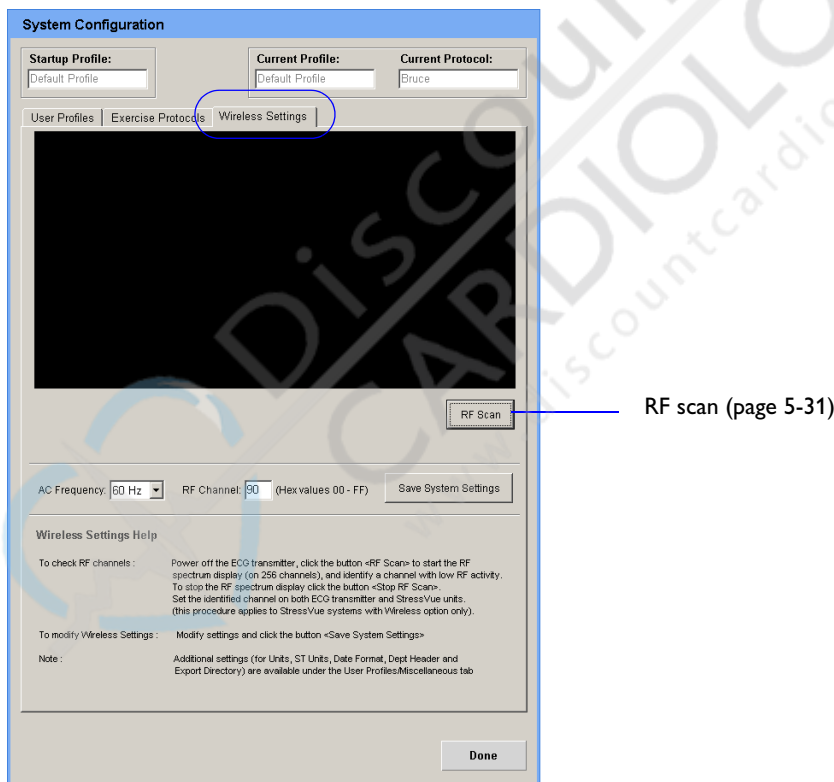
The X-12 wireless transmitter (PIM) transmits signals to StressVue using a specific channel number. Use the Wireless Settings tab to configure it. From this tab, you can:

- Determine the AC frequency used in your country and set it
- Scan for the RF channel with the lowest level of RF activity (thus the best signal)
- Set that channel in StressVue

After you configure the X-12 transmitter settings in StressVue, you must set the RF channel selector dials on the transmitter itself to the same channel so the transmitter can communicate with StressVue.

For additional information about the X-12 wireless transmitter, see the *Mortara X-12 Operator's Manual*, included on the *StressVue Documentation and Training CD*.

**Figure 5-6** Wireless tab in the Configuration window



## Setting the AC Frequency

Determine the frequency used in your country, and set this value here. In the US, the frequency is 60 Hz.

### To set the AC frequency

- 1 Click **Config** on the StressVue Main window.
- 2 Display the Wireless Settings tab.
- 3 Click the AC Frequency drop down list and select the desired frequency.  
Options are 50 Hz or 60Hz.

## Setting the RF Channel

Setting the RF channel requires two steps:

- Scan for the RF channel with the lowest level of RF activity (thus the best signal)
- Set that channel in StressVue

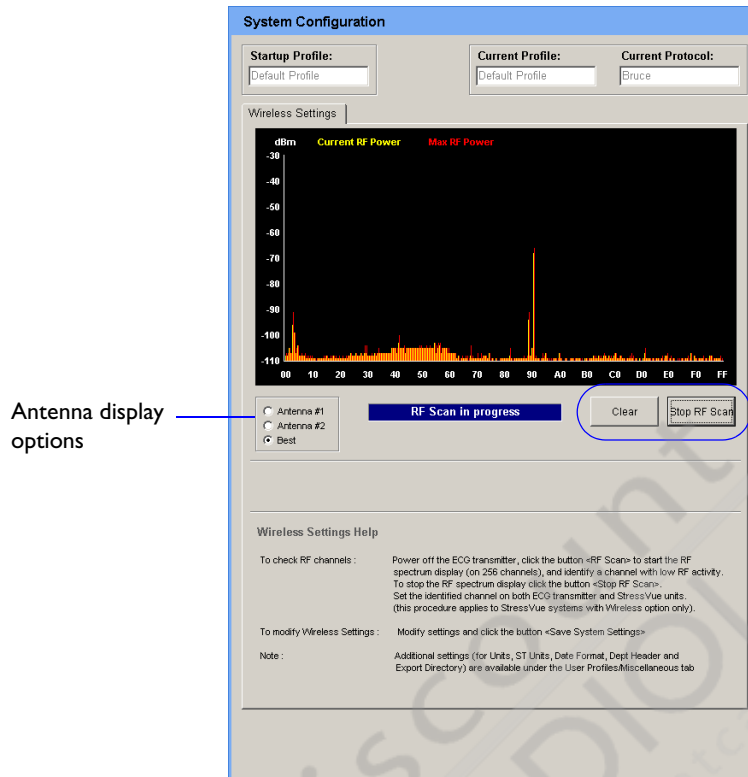
**NOTE** After you set the channel in StressVue, you must set the RF channel selector dials on the X-12 transmitter to the same channel so the transmitter can communicate with StressVue. For details on changing the channel on the transmitter, see the *Mortara X-12 Operator's Manual*, included on the *StressVue Documentation and Training CD*.

### Scanning for an RF Channel

To reduce the amount of noise or interference that can be induced while using the wireless option, you can perform an RF Scan within the StressVue application.



Figure 5-7 RF scan in progress



Antenna display options

#### To perform an RF scan

- 1 Turn off the X-12 wireless transmitter.
- 2 Display the Wireless Settings tab.
- 3 Click **RF Scan** to begin searching for the channel with the lowest level of RF activity (see Figure 5-6 on page 5-30).
- 4 Click the radio button next to the antenna activity to display.  
Options are **Antenna #1**, **Antenna #2**, or **Best** (uses both antennas on the telemetry receiver PCMCIA card).

- 5 Continue the scan for several hours to find the best channel. You do not need to monitor the screen during this time.

The system scans all channels and displays a bar graph showing RF activity found on each channel. The display is cumulative, showing all the scans since you clicked RF Scan. The most recent scan appears in yellow and each earlier scan is red.

Generally, the longer you scan, the better the results. You may get better results if you scan during the hours in which you will be using StressVue, as RF activity varies through the day.

- 6 Continue with “Setting the RF Channel in StressVue” below.

#### To stop an RF scan in process

- ▶ Click **Stop RF Scan**.

**To clear the RF display area**

- ▶ Click **Clear**.

**Setting the RF Channel in StressVue****To set the RF channel in StressVue**

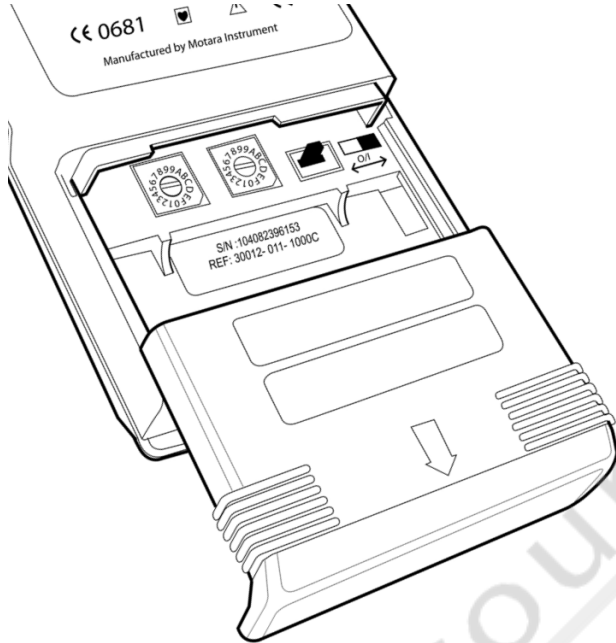
- 1 After allowing the RF Scan to run for several hours, identify a channel with low RF activity. Look for the channel with the smallest graphical bar.  
The RF Scan in Figure 5-7 on page 5-32 shows a generally low level of RF activity, with a high level at channel 90. Avoid the area around channel 90 and choose a channel with as little activity as possible.
- 2 Click **Stop RF Scan**.
- 3 Enter the selected channel number in the RF Channel field (see Figure 5-6 on page 5-30).
- 4 Click **Save System Settings**.
- 5 Click **Done** to close the window.
- 6 Continue with “Setting the Channel on the X-12 Transmitter” below.

**Setting the Channel on the X-12 Transmitter**

After you select the RF channel with the best signal on the **Wireless Settings** tab, you *must* set the RF channel selector dials on the X-12 transmitter to the same channel. Whenever you change the channel on either the X-12 wireless transmitter or the **Wireless Settings** tab, you must also change it on the other.

The two channel-selector dials are located inside the X-12 battery compartment. Each dial has 16 settings, beginning with 0 and ending with F (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F). The dials are preset at the facility to channel 80 (left dial at 8, right dial at 0).

**Figure 5-8** Dials to set the channel in the X-12 transmitter



- 1 Remove the cover of the battery compartment by pushing with both thumbs in the direction of the arrow.
- 2 Turn off the X-12 wireless transmitter by moving the I/O switch to the **Off** position. Use the I/O arrow to guide you.
- 3 Insert a small, flat screwdriver in the slot in the circle of the left dial. Turn the screwdriver clockwise until the arrow is pointing at the first digit or letter of the channel you selected.
- 4 Repeat with the second dial.
- 5 Turn on the X-12 wireless transmitter by moving the I/O switch to the **I** position.
- 6 Close the battery compartment.

For more information about the X-12 wireless transmitter, see the *Mortara X-12 Operator's Manual*, included on the *StressVue Documentation and Training CD*.

## Troubleshooting and Contacting the Response Center

When you encounter a problem working with StressVue, address the issue in the following order:

- 1 Review the Troubleshooting chapter to see if your issue is addressed.
- 2 Contact your StressVue administrator.
- 3 Contact the Philips Response Center.

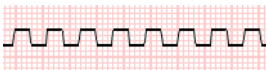
The Philips Response Center can assist with product troubleshooting and provide technical expertise to help with any issue with the StressVue system. For details, visit the following URL on the Web:

[www.medical.philips.com/main/services/response\\_center](http://www.medical.philips.com/main/services/response_center)

### Troubleshooting StressVue Issues

When you are using StressVue, you may encounter some problems with the system. The following table describes some of the more common symptoms and provides information regarding possible causes, and solutions to help you solve potential problems.

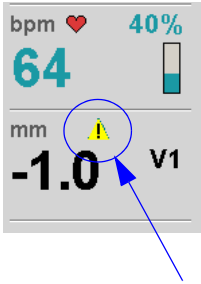
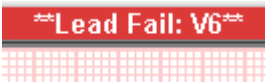
**Table A-1 Troubleshooting StressVue issues**

Problem	Cause	Solution
<b>Waveform Issues</b>		
Baseline drift	Poor skin-to-electrode contact.	Re-prep skin and replace faulty electrodes.
Square waves displayed on the real-time ECG display 	<ul style="list-style-type: none"> <li>■ Lead failure caused by inadequate skin-to-electrode contact.</li> <li>■ Broken lead wire or patient cable.</li> <li>■ RF interference (wireless option only).</li> </ul>	<ul style="list-style-type: none"> <li>■ Correct the faulty lead identified on the upper-right corner of the screen.</li> <li>■ Replace the patient cable.</li> <li>■ Perform an RF scan to determine the presence of RF interference. Select the optimal channel.</li> </ul>
ECG artifact caused by muscle interference	Electrode placed over an area of muscle or fatty tissue.	Find a stable electrode site, re-prep the skin, and apply a new electrode away from muscular and fatty areas.

**Table A-1 Troubleshooting StressVue issues** (continued)

Problem	Cause	Solution
<b>System Navigation Issues</b>		
No response to keyboard commands.	<ul style="list-style-type: none"> <li>■ Disconnected keyboard cable.</li> <li>■ Transposed keyboard or mouse cable.</li> </ul>	<ul style="list-style-type: none"> <li>■ Turn the system off. Check whether the keyboard is connected to the Mouse serial port.</li> <li>■ See the <i>StressVue Installation and Getting Started Guide</i> for correct component connection.</li> </ul>
Cursor does not move	<ul style="list-style-type: none"> <li>■ Disconnected mouse cable.</li> <li>■ Transposed keyboard or mouse cable.</li> </ul>	<ul style="list-style-type: none"> <li>■ Turn the system off. Check whether the mouse is connected to the proper port.</li> <li>■ See the <i>StressVue Installation and Getting Started Guide</i> for correct component connection.</li> </ul>
<b>Treadmill Issues</b>		
Treadmill does not respond to the On command from StressVue	<ul style="list-style-type: none"> <li>■ Equipment was powered up in the wrong sequence.</li> <li>■ The Treadmill power switch is in the Off position, or the treadmill cable is not properly attached.</li> <li>■ The Emergency Stop button is engaged.</li> </ul>	<ul style="list-style-type: none"> <li>■ Turn the treadmill Off through the Treadmill dialog box in StressVue (page 2-34). Wait one minute and turn the power On. Proceed with the test.</li> <li>■ Check the treadmill-to-StressVue cable connection. Turn the Treadmill main power switch to the On position. The switch is located at the base of the treadmill hood, on the left side.</li> <li>■ Reset the Emergency Stop button by turning it clockwise one quarter turn.</li> </ul>
<b>System Error Messages</b>		
Error message appears: No selected exam	An attempt to access a final report is made, but no patient is selected from the list.	Click on the patient name to select it, then access the file.
Error message appears: Not reported exam	<ul style="list-style-type: none"> <li>■ An attempt to exit from the final Report Manager is made, but the report has not been saved.</li> <li>■ An attempt to export a final report is made but the report has not been saved as Reported.</li> </ul>	<ul style="list-style-type: none"> <li>■ Click <b>Save Report</b>, then exit the Report Manager.</li> <li>■ A test is labeled Reported only after it is saved.</li> </ul> <p>Click <b>Save Report</b>, then export the final report.</p>

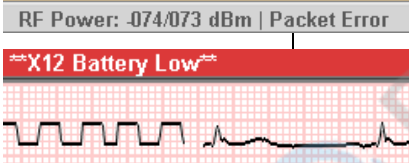
**Table A-1 Troubleshooting StressVue issues** (continued)

Problem	Cause	Solution
<b>System Error Messages</b> (continued)		
	<p>A warning sign appears on the screen, next to the ST measurements.</p>	<p>The measuring points (J point, Isoelectric point or J + XX msec) have been modified by the user during or after the stress test. The warning sign indicates that a manual change occurred and that the results are now based on user decisions.</p>
	<p>One or more leads have failed.</p>	<p>Connect the electrodes. Once connected, the warning message disappears.</p>
<p>Error message appears: No stage selected</p>	<p>In the protocol edit function, an attempt is made to edit a stage, but no stage has been selected.</p>	<p>Double-click on the stage to edit. The Edit window appears, allowing you to change the stage parameters.</p>
<p>The message appears: Unknown Device or Unknown Manufacturer</p>	<p>The StressVue PCMCIA ECG Processor card is not recognized due to an incorrect installation or lack of installation of the device driver.</p>	<p>Reinstall the StressVue system software. See the <i>StressVue Installation and Getting Started Guide</i>.</p>
<p>Error message appears: ECG front-end error - Can't proceed</p>	<ul style="list-style-type: none"> <li>■ The PCMCIA ECG card is not correctly inserted.</li> <li>■ Incorrect Power Savings settings.</li> </ul>	<ul style="list-style-type: none"> <li>■ Remove the card from the PCMCIA slot and reinsert it. The system emits a confirmation beep when the card is installed properly.</li> <li>■ Restart the PC. If this fixes the problem, it is likely that your system has incorrect Power Saving settings configured. Specify the settings as follows:                         <ul style="list-style-type: none"> <li>a Exit the StressVue application.</li> <li>b Click <b>Start &gt; Settings &gt; Control Panel</b>.</li> <li>c Double-click <b>Power Management</b>.</li> <li>d Set the Stand-By option to Never.</li> <li>e Click <b>OK</b> and exit the Control Panel.</li> <li>f Restart StressVue.</li> </ul> </li> </ul>

**Table A-1 Troubleshooting StressVue issues** *(continued)*

Problem	Cause	Solution
<b>Printer Issues</b>		
<ul style="list-style-type: none"> <li>■ Thermal printer paper out light is on</li> <li>■ Thermal writer is not printing</li> <li>■ Uneven printing of ECGs or reports</li> </ul>	<ul style="list-style-type: none"> <li>■ Paper jammed.</li> <li>■ No paper in tray.</li> <li>■ Open writer door.</li> <li>■ Printer head needs cleaning.</li> </ul>	<ul style="list-style-type: none"> <li>■ Open writer cover and remove jammed paper.</li> <li>■ Insert new pack of paper in tray.</li> <li>■ See if writer door is latched.</li> <li>■ Refer to cleaning instructions in Chapter 4, “Maintaining the StressVue System.”</li> </ul>
No printing	<ul style="list-style-type: none"> <li>■ LAN settings may be incorrect.</li> <li>■ Network cable may be loose.</li> <li>■ Power cord may be disconnected.</li> <li>■ Printer might not have paper loaded.</li> <li>■ Printer error.</li> </ul>	<ul style="list-style-type: none"> <li>■ Check to see that the Local Area Network Connection Properties settings on the PC are defined correctly</li> <li>■ Ensure that a crossover network cable is used and check connections.</li> <li>■ Check AC power cord connections and confirm that the Power On indicator is illuminated.</li> <li>■ Check to see that paper has been loaded.</li> <li>■ Check to see that no error indicator lights are illuminated.</li> </ul>
Uneven printing	<p>Possible causes of uneven printing:</p> <ul style="list-style-type: none"> <li>■ Print head itself</li> <li>■ Platen</li> <li>■ Poor or damaged paper</li> <li>■ Mechanical misalignment of the print head</li> </ul>	<p>Have a technician:</p> <ul style="list-style-type: none"> <li>■ Check the platen for uneven wear.</li> <li>■ Verify that the print head shoulder screws are secure before replacing the print head.</li> </ul> <p>The shoulder screws that secure the print head should be properly centered in their holes, allowing the print head slight vertical movement.</p>
No motor drive	<ul style="list-style-type: none"> <li>■ Insufficient paper tension</li> <li>■ Faulty writer assembly</li> <li>■ Faulty circuit board</li> </ul>	Check and replace as needed.
Defective paper	Thermal paper that is old or which was improperly stored can cause light or uneven printing. Exposure to heat or chemical vapors can damage the paper.	Test printer using a fresh pack of properly stored paper.

**Table A-1 Troubleshooting StressVue issues** (continued)

Problem	Cause	Solution
<b>Printer Issues</b> (continued)		
Gaps in printing	<ul style="list-style-type: none"> <li>■ Shorts, damaged cable, or damaged connectors</li>   <li>■ Defective print head</li> <li>■ Defective circuit board</li>   <li>■ Uneven or damaged paper</li> </ul>	<p>Have a technician:</p> <ul style="list-style-type: none"> <li>■ Check the power head cable and the signal cable for shorts, openings, or damaged connectors. These cables plug in between the circuit board and the thermal print head.</li> <li>■ Check the print head. Replace if needed.</li> <li>■ Check the circuit board. Replace if needed.</li> <li>■ Replace the paper.</li> </ul>
<b>X-12 Ambulatory (Wireless) Patient Module Issues</b>		
<p>Wireless option only. Packet errors/ signal drop</p> 	<p>Signal on the screen shows artifact and/or square waves intermittently.</p>	<p>Review any messages in the upper right corner of the display. A lead failure message (X12 Battery Low) indicates the system is not receiving ECG signals.</p> <p>Check that no 2.4 GHz network units operate in the proximity of the StressVue system.</p> <p>Perform an RF Scan to locate the source of the interference and to change to the optimal channel for the X-12 transmitter.</p>
<p>Wireless option only. No waveform signal on the screen</p>	<p>With the patient (or simulator) connected, no waveforms are displayed; only the square waveform and lead-fail indicator appear.</p> <p><b>NOTE:</b> If neither the signal nor the squared waveform is present, click <b>Abort</b> and start a new exam from the Main window.</p>	<p>Check the StressVue Miscellaneous settings, as well as the X-12 transmitter to ensure that the two units are set to the same channel.</p> <p>For details about setting the receiving channel settings, see Chapter 5, “Configuring StressVue.” For details about the wireless settings, see the <i>Mortara X-12 Operator’s Guide</i> for instructions.</p>

## Contacting Technical Support

### Philips Response Center Contact Information

#### North America

Country	Telephone Number
Canada	(800) 323 2280
Mexico	52 55 5269 9000
Puerto Rico	1 787 730 2345
United States	(800) 548 8833
Miami (Spanish speaking)	954 835 2650

#### South America

Country	Telephone Number
Argentina	54 11 4546 7686
Brazil	55 11 4689 6880
Chile	56 2 730 2500
Columbia	57 1 422 2600
Venezuela	58 21 2207 6800

#### Europe

Country	Telephone Number
United Kingdom	07 002 432 58 472 or 07 002 HEALTHRC
Austria	01 25125 333
Belgium	32 2 525 7102 (French) 32 2 525 7103 (Flemish)
Finland	010 855 2455
France	0803 35 34 33
Germany	0180 5 47 5000
Italy	0800 8256087

**Europe**

<b>Country</b>	<b>Telephone Number</b>
Netherlands	31 4 027 87630
Spain	34 90 230 4050
Sweden	08 5064 8830
Switzerland	0800 80 10 23

**Asia Pacific**

<b>Country</b>	<b>Telephone Number</b>
Australia	1800 251 400
China	800 810 0038
Hong Kong	852 2876 7578
India	
New Delhi	011 2695 9734
Mumbai	022 5691 2643/2431
Calcutta	2485 3718
Chennai	044 555 01000
Bangalore	080 5091 911
Hyderabad	040 5578 7974
Indonesia	021 794 7542
Japan	0120 381 557
Korea	080 372 7777 (toll free)
Seoul	02 3445 9010
Macau	0800 923
Malaysia	1800 886 188
New Zealand	0800 251 400
Philippines	02 845 7875
Singapore	1 800 Philips
Taiwan	0800 005 616
Thailand	02 614 3569

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## Protocol Reference

This appendix provides an example of each of the included protocols. You can define and edit protocols. For details, see “Defining and Modifying Protocols” on page 5-7.

The following seven protocols are delivered with every StressVue system:

- Bruce
- Modified Bruce
- Naughton
- Balke
- Ellestad
- Pharmacological
- Bicycle

The following sections provide an example of each of these protocols.

**NOTE** The *Pre-exercise* and *Recovery* phase settings are the same for all protocols except for Pharmacological and Bicycle. One example of each is shown in the Bruce protocol section.

### Bruce Protocol

This sample Bruce protocol produces the following operations and conditions:

- A stage change occurs every 3 minutes with an increase in treadmill speed and grade.
- An automatic blood pressure measurement is initiated one minute before the end of each stage.
- A 12-lead ECG report is automatically printed at the end of each stage. ECG acquisition begins 12 seconds prior to the end of a stage.
- In the *Recovery* phase, the treadmill slows to 0.5 mph and the following reports are automatically printed:
  - The **Peak Exercise** ECG report prints immediately.
  - A **Recovery** ECG prints in one minute.
  - A **Recovery** ECG prints every two minutes until the end of the *Recovery* phase.
- Blood pressure measurement is set to every 2 minutes (2, 4, 6, 8...) until the end of the *Recovery* phase.

**Figure B-1 Sample Bruce protocol (Pre-exercise phase)**

Protocol Name:

Equipment:

Pre-Exercise | Exercise | Recovery

Speed/Grade

mph  %

**Figure B-2 Sample Bruce protocol (Exercise phase)**

Protocol Name:

Equipment:

Pre-Exercise | Exercise | Recovery

Number of Stages:

	mm:ss	mph	%		
	Time	Speed	Grade	ECG Print	BP Meas
Stage 1	3:00	1.7	10.0	End	End
Stage 2	3:00	2.5	12.0	End	End
Stage 3	3:00	3.4	14.0	End	End
Stage 4	3:00	4.2	16.0	End	End
Stage 5	3:00	5.0	18.0	End	End
Stage 6	3:00	5.5	20.0	End	End
Stage 7	3:00	6.0	22.0	End	End

**Figure B-3 Sample Bruce protocol (Recovery phase)**

## Modified Bruce

The Pre-exercise and Recovery phase settings are the same as for the Bruce protocol. See Figure B-1 on page B-2 and Figure B-3, above.

**Figure B-4 Sample Modified Bruce protocol (Exercise phase)**

	mm:ss	mph	%		
	Time	Speed	Grade	ECG Print	BP Meas
Stage 1	3:00	1.7	0.0	End	End
Stage 2	3:00	1.7	5.0	End	End
Stage 3	3:00	1.7	10.0	End	End
Stage 4	3:00	2.5	12.0	End	End
Stage 5	3:00	3.4	14.0	End	End
Stage 6	3:00	4.2	16.0	End	End
Stage 7	3:00	5.0	18.0	End	End
Stage 8	2:00	5.5	20.0	End	End
Stage 9	2:00	6.0	22.0	End	End

# Naughton Protocol

The Pre-exercise and Recovery phase settings are the same as for the Bruce protocol. See Figure B-1 on page B-2 and Figure B-3 on page B-3.

**Figure B-5 Sample Naughton protocol (Exercise phase)**

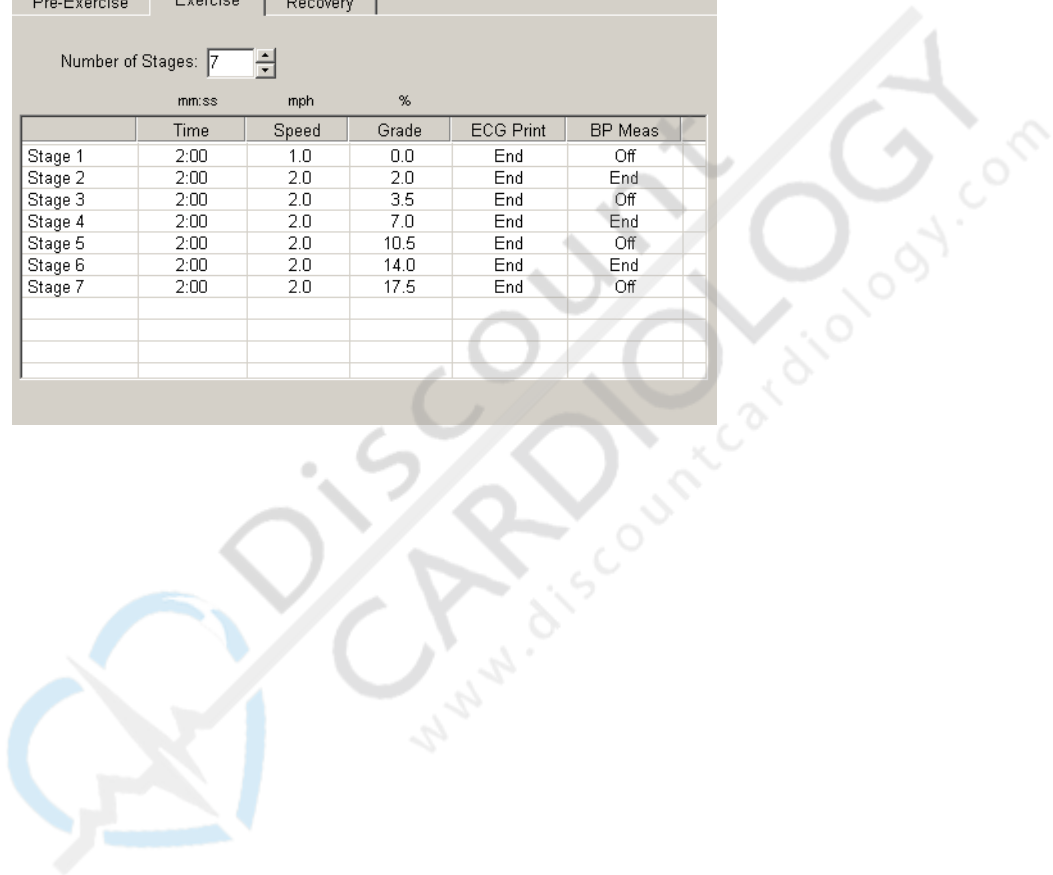
Protocol Name:  Set as Current Protocol

Equipment:

Pre-Exercise | **Exercise** | Recovery

Number of Stages:

	mm:ss	mph	%		
	Time	Speed	Grade	ECG Print	BP Meas
Stage 1	2:00	1.0	0.0	End	Off
Stage 2	2:00	2.0	2.0	End	End
Stage 3	2:00	2.0	3.5	End	Off
Stage 4	2:00	2.0	7.0	End	End
Stage 5	2:00	2.0	10.5	End	Off
Stage 6	2:00	2.0	14.0	End	End
Stage 7	2:00	2.0	17.5	End	Off



## Balke Protocol

The Pre-exercise and Recovery phase settings are the same as for the Bruce protocol. See Figure B-1 on page B-2 and Figure B-3 on page B-3.

**Figure B-6 Sample Balke protocol (Exercise phase)**

Protocol Name:

Equipment:

Pre-Exercise | **Exercise** | Recovery

Number of Stages:

	mm:ss	mph	%		
	Time	Speed	Grade	ECG Print	BP Meas
Stage 1	1:00	3.3	1.0	End	Off
Stage 2	1:00	3.3	2.0	End	Off
Stage 3	1:00	3.3	3.0	End	End
Stage 4	1:00	3.3	4.0	End	Off
Stage 5	1:00	3.3	5.0	End	Off
Stage 6	1:00	3.3	6.0	End	End
Stage 7	1:00	3.3	7.0	End	Off
Stage 8	1:00	3.3	8.0	End	Off
Stage 9	1:00	3.3	9.0	End	End
Stage 10	1:00	3.3	10.0	End	Off
Stage 11	1:00	3.3	11.0	End	Off
Stage 12	1:00	3.3	12.0	End	End
Stage 13	1:00	3.3	13.0	End	Off
Stage 14	1:00	3.3	14.0	End	Off
Stage 15	1:00	3.3	15.0	End	End
Stage 16	1:00	3.3	16.0	End	Off
Stage 17	1:00	3.3	17.0	End	Off
Stage 18	1:00	3.3	18.0	End	End
Stage 19	1:00	3.3	19.0	End	Off
Stage 20	1:00	3.3	20.0	End	Off
Stage 21	1:00	3.3	21.0	End	End
Stage 22	1:00	3.3	22.0	End	Off

## Ellestad Protocol

The Pre-exercise and Recovery phase settings are the same as for the Bruce protocol. See Figure B-1 on page B-2 and Figure B-3 on page B-3.

**Figure B-7 Sample Ellestad protocol (Exercise phase)**

Protocol Name: **Ellestad**

Equipment:

Pre-Exercise | **Exercise** | Recovery

Number of Stages:

	mm:ss	mph	%		
	Time	Speed	Grade	ECG Print	BP Meas
Stage 1	3:00	1.7	10.0	End	End
Stage 2	2:00	3.0	10.0	End	End
Stage 3	2:00	4.0	10.0	End	End
Stage 4	3:00	5.0	10.0	End	End
Stage 5	2:00	6.0	15.0	End	End
Stage 6	2:00	7.0	15.0	End	End
Stage 7	2:00	8.0	15.0	End	End

## Pharmacological Protocol

**Figure B-8 Sample Pharmacological protocol (Pre-exercise phase)**

Protocol Name: **Pharmacological**

Equipment:

Pre-Exercise | **Exercise** | Recovery

Speed/Grade

mph  %

**Figure B-9 Sample Pharmacological protocol (Exercise phase)**

Protocol Name:

Equipment:

Pre-Exercise | **Exercise** | Recovery

Number of Stages:

	mm:ss	mph	%		
	Time	Speed	Grade	ECG Print	BP Meas
Stage 1	3:00	0.0	0.0	Timed	End
Stage 2	3:00	0.0	0.0	Timed	End
Stage 3	3:00	0.0	0.0	Timed	End
Stage 4	3:00	0.0	0.0	Timed	End
Stage 5	3:00	0.0	0.0	Timed	End
Stage 6	3:00	0.0	0.0	Timed	End
Stage 7	3:00	0.0	0.0	Timed	End

**Figure B-10 Sample Pharmacological protocol (Recovery phase)**

Protocol Name:

Equipment:

Pre-Exercise | **Exercise** | **Recovery**

Speed/Grade

mph  %

AutoPrint:   mm:ss starting at:  mm:ss

BP Measure:   mm:ss starting at:  mm:ss

# Bicycle Protocol

**Figure B-11 Sample Bicycle protocol (Pre-exercise phase)**

Protocol Name:

Equipment:

Pre-Exercise | Exercise | Recovery

Power:  Watts

**Figure B-12 Sample Bicycle protocol (Exercise phase)**

Protocol Name:

Equipment:

Pre-Exercise | Exercise | Recovery

Number of Stages:

	mm:ss	Watts		
	Time	Power	ECG Print	BP Meas
Stage 1	3:00	25	End	End
Stage 2	3:00	50	End	End
Stage 3	3:00	75	End	End
Stage 4	3:00	100	End	End
Stage 5	3:00	125	End	End
Stage 6	3:00	150	End	End
Stage 7	3:00	175	End	End
Stage 8	2:00	200	End	End
Stage 9	2:00	225	End	End
Stage 10	2:00	250	End	End

**Figure B-13 Sample Bicycle protocol (Recovery phase)**

Protocol Name:

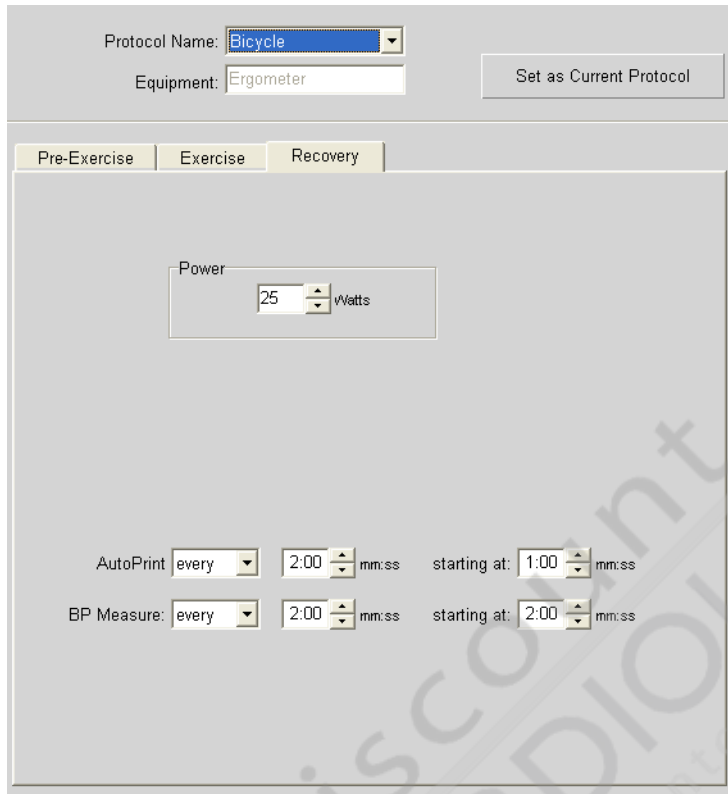
Equipment:

Pre-Exercise   Exercise   Recovery

Power:  Watts

AutoPrint:   mm:ss   starting at:  mm:ss

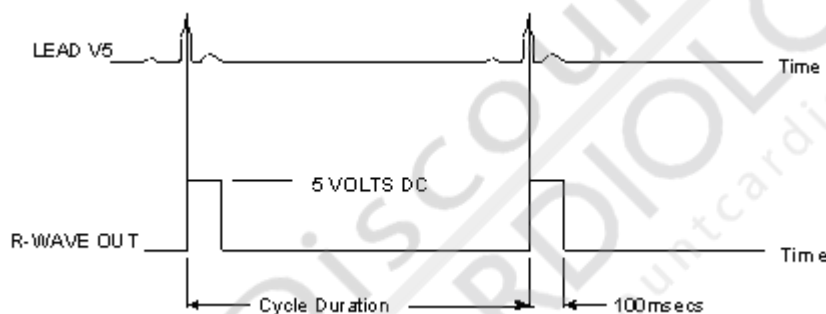
BP Measure:   mm:ss   starting at:  mm:ss



## TTL Export for Echo

Philips Medical Systems provides the capability of interfacing the StressVue Exercise Stress Testing System to cardiac ultrasound (echo) imaging systems for performing stress/echo tests. This function is accomplished through an optional TTL (transistor, transistor, logic) output.

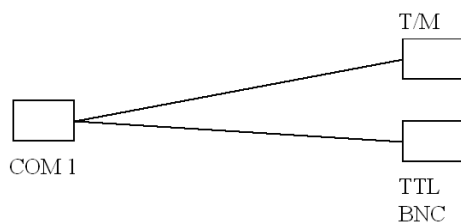
The signal complies with the TTL standards and can be derived from any of the 12 leads. For details, see “Specifying the Sync Lead (TTL Output Option)” on page 2-14. The ECHO captures images of ventricular systole and diastole based on R-wave gating.



### Sample Representation of R-wave Pulse Output

The TTL option includes a Y cable that must be plugged into the COM1 (Serial Port 1) port on the back of the CPU (this port is the same as that used for the treadmill).

The cable provides a connector for the treadmill and a BNC connector for the TTL output. You must provide an adequate cable to connect to the ECHO system. For details on ordering the option, see Appendix E, “Ordering Options and Parts.”



**WARNING** Equipment connected via the TTL cable must be IEC 60601-1 compliant.

## Configuring and Using the Printer

The StressVue system supports two different printers:

- StressVue thermal printer
- HP LaserJet 4200 Series with WinXP drivers

This appendix provides the following information:

StressVue Thermal Printer . . . . .	D-1
Thermal Printer Dimensions and Specifications . . . . .	D-2
Loading the Thermal Printer Paper . . . . .	D-5
Setting Up the Thermal Printer . . . . .	D-6
Maintaining the Thermal Printer . . . . .	D-7
Inspecting the StressVue Thermal Printer . . . . .	D-7
Cleaning the StressVue Thermal Printer . . . . .	D-7
Testing Printer Operation . . . . .	D-8
Post-Service Testing . . . . .	D-8
HP 4200 LaserJet Printer . . . . .	D-9

For printer troubleshooting, see Appendix A, “Troubleshooting and Contacting the Response Center.”

### StressVue Thermal Printer

The StressVue thermal printer uses an eight-dot-per-millimeter (dpm) print head to print ECG tracings and report data. Multiple print formats are supported.

The StressVue thermal printer includes:

- Hospital grade power cord for connection to the isolation transformer
- Crossover network cable for connection to the PC

## Thermal Printer Dimensions and Specifications

Figure D-1 StressVue thermal printer dimensions

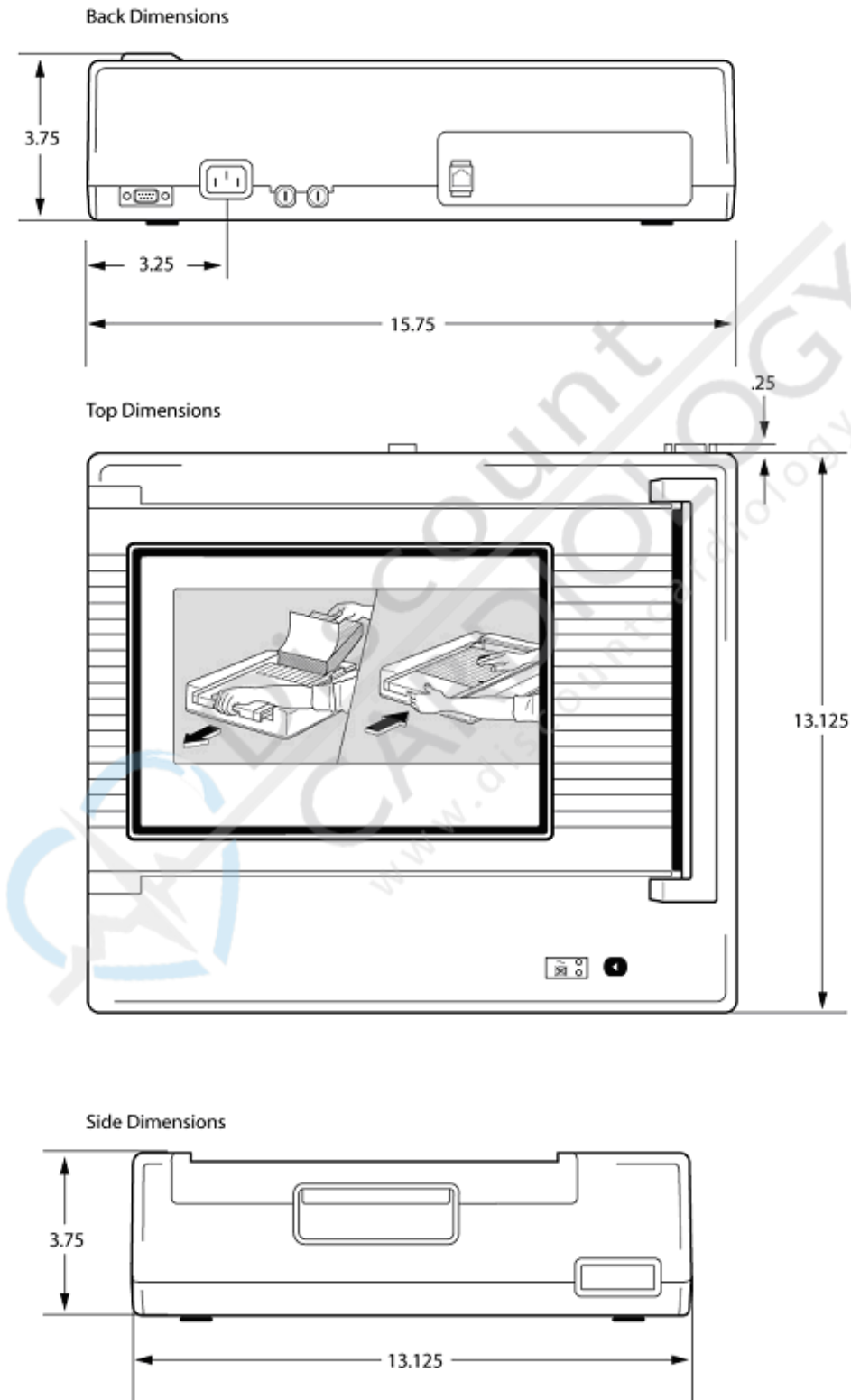


Figure D-2 StressVue thermal printer



Table D-1 StressVue thermal printer specifications

Feature	Specification
<b>Instrument Type</b>	Thermal printer
<b>Paper Type</b>	8 ½ inch x 11 inch, cued, perforated, z-fold with full grid
<b>Recording Technique</b>	Computer controlled, thermal dot array, 8 dots/mm
<b>Writer Speeds</b>	5, 10, 25, or 50 mm/sec, computer controlled
<b>External Ports and Data Interfaces</b>	<ul style="list-style-type: none"> <li>■ Networking capability to allow high speed data transfer for printing</li> <li>■ External RJ-45 connector</li> </ul>
<b>Chassis leakage current</b>	Meet or exceed requirements of ANSI/AAMI EC11
<b>Power</b>	100-240 VAC at 50/60 Hz
<b>Weight</b>	9 pounds
<b>Dimensions H x W x D</b>	4" x 16" x 13" (10 cm x 41 cm x 33 cm)
<b>Fuses</b>	T-Type 1 Amp, 250 V
<b>Special Functions</b>	LAN communication that provides continuous printing

**NOTE** Specifications subject to change without notice.

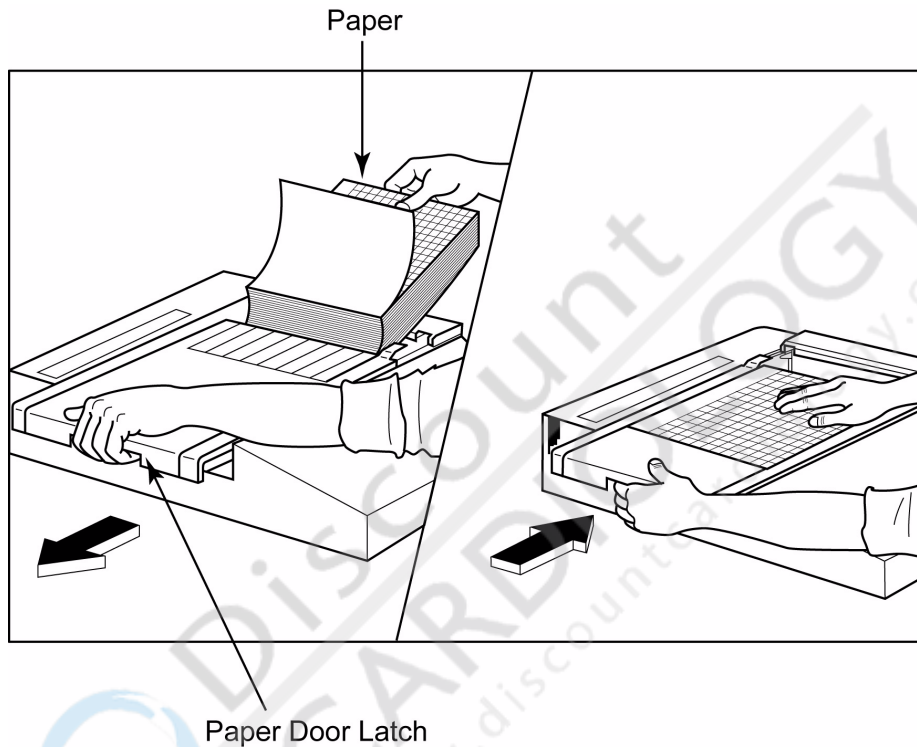
**Table D-2 Input and Output descriptions**

Feature	Description
AC Power	The StressVue thermal printer operates on 120/240 VAC at 50/60 Hz. Power is supplied to the thermal writer as soon as the AC power cord is connected to an AC power outlet.
Power On Indicator	This indicator will illuminate in green when AC power is applied.
Form Feed / Reset Button	The form feed push button is a momentary contact switch that advances the paper until an infrared, reflective sensor detects a “cue mark” on the printing side of the paper. This button will reset the thermal printer when it is depressed for a period of seven seconds.
Hard Copy Printout	The StressVue thermal printer uses 8 1/2” x 11” sheets of Z-folded, thermal sensitive paper with cue marks. Printing speeds are 10, 25, and 50 mm per second. Dot density is eight dots per millimeter or 203.2 dpi.
Paper Out / Writer Error Indicator	This indicator will illuminate in green when writer error conditions are detected. Errors include not detecting a cue mark at the expected time (due to a paper jam or drive system failure) and detecting a cue mark longer than expected. The writer error will remain latched until the form feed button is depressed.

## Loading the Thermal Printer Paper

### To load the paper

- 1 Remove the outer packaging from the paper pack.
- 2 Facing the front of the unit, use the release latch on the left side and slide the paper tray cover to the left.

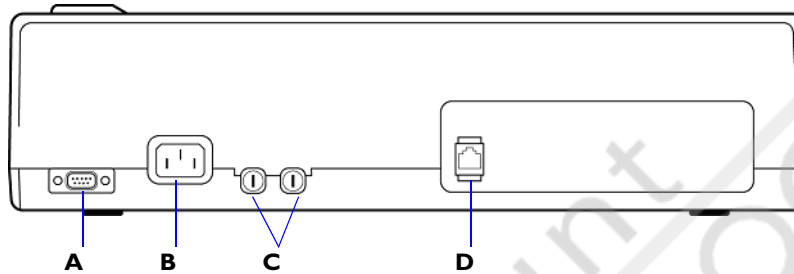


- 3 Place the pack of thermal paper into the paper tray such that the grid side of the paper is up when it is pulled over the paper tray cover. The paper cue mark (a small black rectangle) should be in the lower left corner.
- 4 Manually advance one page of paper beyond the closure point of the writer. Make sure the paper lays on the black roller evenly within the channel of the paper door.
- 5 Slide the writer cover to the right until the cover latches in a locked position. You will hear a sharp click when the door is properly latched.
- 6 Push the form-feed button to align the cue mark and prepare the paper for printing.

## Setting Up the Thermal Printer

### To connect the StressVue thermal printer

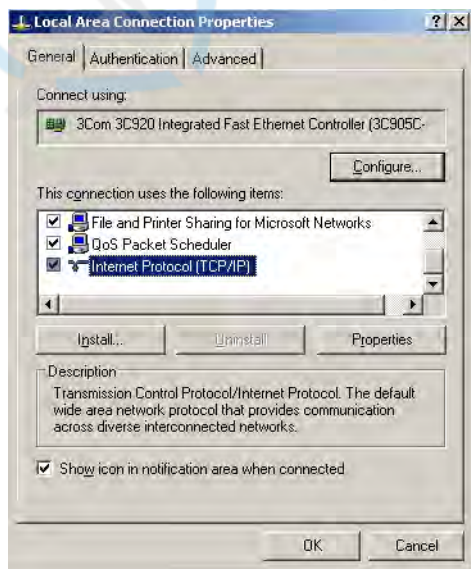
- 1 Connect the AC power cord to the AC connector (**B**) on the printer and to an AC power outlet.
- 2 Connect one end of the crossover network cable to the network connector (**D**) on the StressVue thermal printer and the other end to the network connector on the back of the StressVue PC.



- |                                      |  |
|--------------------------------------|--|
| <b>A</b> Serial connector. Not used. | <b>B</b> AC connector (for power cord) |
| <b>C</b> AC fuses                    | <b>D</b> Network connector             |

### To configure the LAN connection for the printer

- 1 On the StressVue PC, ensure you are logged in as Administrator.
- 2 Click **Start > Settings > Control Panel**.
- 3 Double-click **Network Connections**.
- 4 Double-click the appropriate **Local Area Network** icon.  
The Local Area Connection Properties dialog box appears.



- 5 In the items list, select Internet Protocol (TCP/IP), and click **Properties**.  
The Properties dialog box appears.
- 6 Fill in the fields as illustrated, then click **OK** in each dialog box to save the entries and exit.

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

Obtain an IP address automatically  
 Use the following IP address:

IP address:	192 . 168 . 10 . 100
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	192 . 168 . 10 . 1

## Maintaining the Thermal Printer

If the hospital or institution fails to implement a satisfactory cleaning and inspection schedule for this equipment, it may result in equipment failure and health hazards.

**NOTE** Only qualified service personnel should repair or replace StressVue thermal printer parts.

### Inspecting the StressVue Thermal Printer

Inspect the equipment for the following conditions on a regular basis:

- Examine power cable and the network cable for obvious damage (for example, torn insulation, broken connectors, and so on). Replace cables as necessary.
- All cords and connectors are securely seated in their corresponding connections.
- Examine the equipment for missing screws, cracks or broken areas that might allow unintended access to internal electronics areas

### Cleaning the StressVue Thermal Printer

#### To clean the printer

- 1 Disconnect the power source.
- 2 Clean the exterior surface of the unit with a damp cloth using a solution of mild dishwashing detergent diluted in water.
- 3 After washing, thoroughly dry off the unit with a clean, soft cloth or paper towel.

Clean the print head monthly, as described next.

### To clean the print head

**NOTE** Do not let soap or water come into contact with the writer, plugs, jacks or vents.

- 1 Open the writer door.
- 2 Lightly rub the print head with an alcohol pad.
- 3 Wipe with a clean cloth to remove alcohol residue.
- 4 Allow the print head to air dry.
- 5 Clean the platen by using adhesive tape. Apply the tape and pull it off. Rotate roller and repeat until entire roller is clean.
- 6 Clean the cue sensor photo detector.

### Testing Printer Operation

After cleaning and inspecting the thermal printer, confirm that the printer is working properly.

#### To test printer operation

- ▶ Using an ECG simulator with the stress testing system, acquire and print ECGs of known amplitude.

A successfully printed ECG report has the following characteristics:

- Printing should be dark and even across the page.
- There should be no evidence of print-head dot failure (for example, breaks in printing forming horizontal streaks).
- Paper motion should be smooth and consistent during printing.
- Waveforms should appear normal, with proper amplitude, and without distortion or excessive noise.
- Paper should stop with perforations near the tear-bar (indicating proper cue sensor operation).

### Post-Service Testing

Following any service to the StressVue Thermal Printer or when non-compliant operation is suspected, Philips Medical Systems recommends the following procedures:

- Confirm proper operation as described in “Testing Printer Operation” on page D-8.
- Perform testing to ensure continued electrical safety of the device (use IEC 60601-1 or ANSI/AAMI ES1 methods and limits).
  - Earth leakage current.

**NOTE** There is no exposed metal and no patient connection to this unit.

## HP 4200 LaserJet Printer

StressVue also supports the use of the HP 4200 LaserJet printer using drivers for the Windows XP operating system. It is capable of printing reports, without a grid, at 35 ppm. It prints with a grid at approximately 2 ppm.

For details about this printer, refer to the HP website ([www.hp.com](http://www.hp.com)) or to the printer documentation.



## Ordering Options and Parts

This appendix describes the parts and options available for the StressVue system.

### Supplies and Ordering Information

The part numbers for all supplies for the StressVue system are listed in this section.

#### Ordering Supplies

All supplies may be ordered on the web at:

<http://shop.medical.philips.com>

Use the part numbers listed below for reference to ensure that the correct supplies are ordered.

#### Optional Parts and Accessories

For more information on accessories or to place an order, contact the nearest Philips Response Center. See “Philips Response Center Contact Information” on page A-6.

**Figure E-1 StressVue accessories**

Part Number	Item
<b>Leads and Accessories</b>	
989803136951	Standard patient lead – AAMI
989803136961	Standard patient lead – IEC
989803137661	Large patient lead – AAMI
989803137671	Large patient lead – IEC
989803137961	Pouch (for the X-12 wireless transmitter)
989803137971	Velcro belt with pouch (for the direct connect patient module)

**Figure E-1 StressVue accessories** (continued)

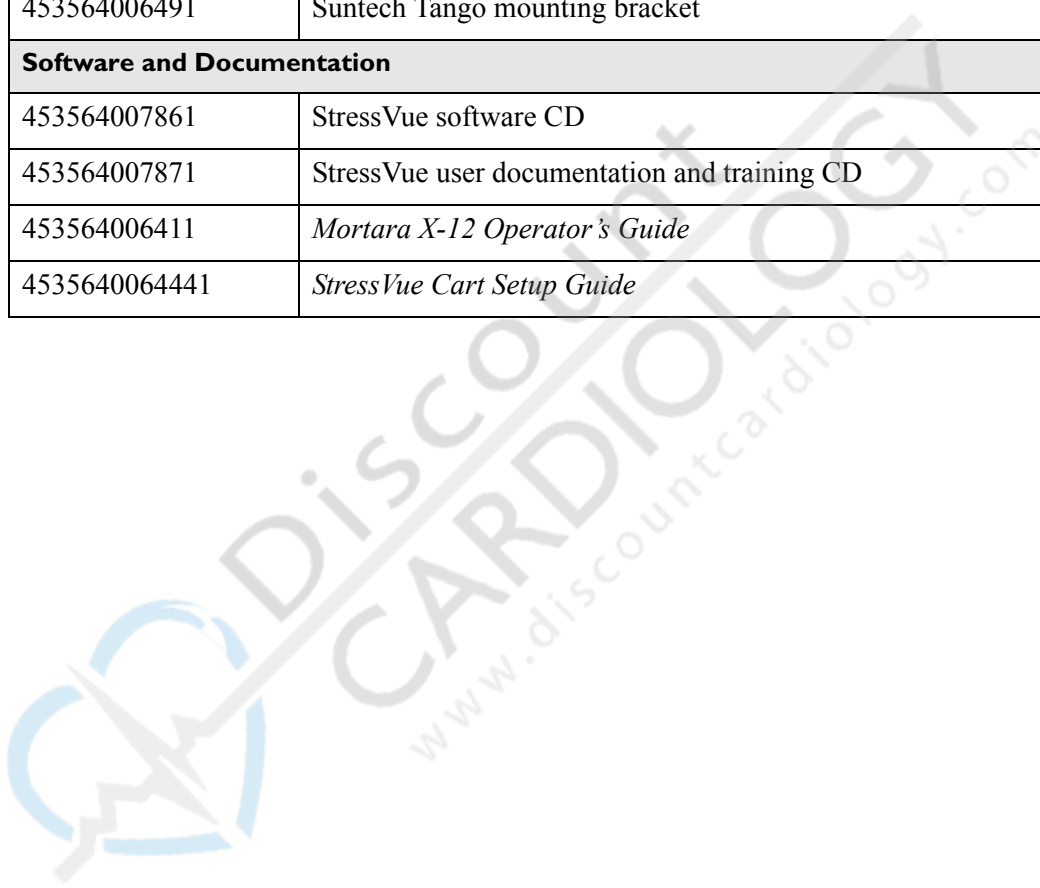
Part Number	Item
<b>Patient Modules, PCMCIA Cards, Card Reader</b>	
453564004871	PCMCIA card reader (part of Patient Module Wireless Kit 453564004841 or Patient Module Direct Connect Kit 453564004791)
453564004851	X-12 ambulatory transmitter (part of Patient Module Wireless Kit 453564004841) <b>NOTE:</b> Not currently available in the US.
453564004821	Wireless PCMCIA card (part of Patient Module Wireless Kit 453564004841)
453564004801	Direct connect patient module (part of Patient Module Direct Connect Kit 453564004791)
453564004881	Direct connect PCMCIA card (part of Patient Module Direct Connect Kit 453564004791)
<b>Patient Module Kits</b>	
453564004791	Direct Connect StressVue Kit
453564004801	Direct connect patient module
453564004871	PCMCIA card reader
453564004881	Direct connect PCMCIA card
453564007871	StressVue Documentation and Training CD
453564009661	StressVue Installation and Getting Started Guide
453564006381	StressVue System Label
453564007861	StressVue Software CD
453564010841	Bracket Assembly - Floppy Disk Drive
453564006391	Shrouded Power cord - 3
13942E	Adult Plastic Tape ECG Electrode, Disp.
M4606A	ECG Skin Preparation Paper
453564004841	Wireless StressVue Kit
453564004851	X-12 ambulatory transmitter <b>NOTE:</b> Not currently available in the US.
453564004871	PCMCIA Card Reader
453564004821	Telemetry Card

**Figure E-1 StressVue accessories** (continued)

Part Number	Item
<b>Patient Module Kits</b> (continued)	
453564006421	Wireless Module Pouch
453564007871	StressVue Documentation and Training CD
453564009661	StressVue Installation and Getting Started Guide
453564006381	StressVue System Label
453564010841	Bracket Assembly - Floppy Disk Drive
453564006391	Shrouded Power cord - 3
13942E	Adult Plastic Tape ECG Electrode, Disp.
M4606A	ECG Skin Preparation Paper
<b>Printer</b>	
453564004921	StressVue thermal printer
989803137010	Thermal printer paper Thermal printer paper for use with the Philips StressVue system, 860295. Each case consists of 12 packs, each containing 250 sheets. The paper dimension is 8.5 x 11.
<b>Isolation Transformer and Power Cord</b>	
453564004901	Isolation transformer 115V
453564004911	Isolation transformer 230V
453564006391	Shrouded power cord
<b>Interface Cables</b>	
989803136971	TrackMaster I/F cable
989803136981	Lode ergometer I/F cable
989803136991	Ergoline ergometer I/F cable
989803137001	Echo/TTL I/F cable
453564007061	StressVue thermal printer I/F cable
<b>Cart Accessories</b>	
989803137441	StressVue system cart
453564006471	StressVue LCD arm
453564006531	StressVue cart front caster kit
453564006511	StressVue cart rear caster kit

**Figure E-1 StressVue accessories** *(continued)*

Part Number	Item
<b>Cart Accessories</b> <i>(continued)</i>	
453564006451	StressVue cart paper tray
453564006461	StressVue cart mouse pad platform
453564006481	StressVue cart basket
453564006491	Suntech Tango mounting bracket
<b>Software and Documentation</b>	
453564007861	StressVue software CD
453564007871	StressVue user documentation and training CD
453564006411	<i>Mortara X-12 Operator's Guide</i>
453564006441	<i>StressVue Cart Setup Guide</i>



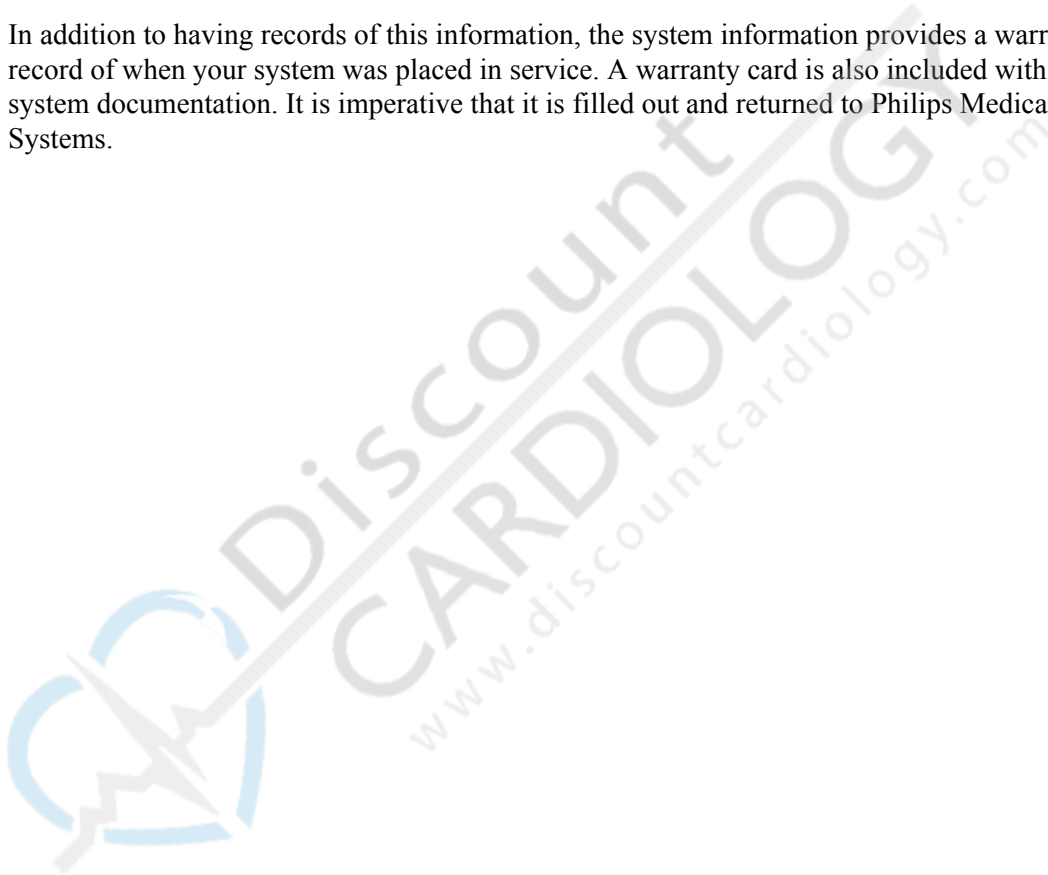
## System Information Log

The system information log on the following page is provided for your convenience. You will need this information to set up your system if it needs servicing. Be sure to add notes to your log when you add options or your system has been serviced.

**NOTE** It is strongly recommended that you make a copy of this log and file it after you enter the information.

Record the model and serial number of all components, dates of removal, and/or replacement of components, and the name of the vendor from whom the component was purchased and/or installed.

In addition to having records of this information, the system information provides a warranty record of when your system was placed in service. A warranty card is also included with the system documentation. It is imperative that it is filled out and returned to Philips Medical Systems.





## Specifications and Requirements

For details about setting up the system, see *StressVue Installation and Getting Started Guide*. For details about setting up the utility cart, refer to the *StressVue Cart Setup Guide*, provided with the cart.

**NOTE** No user serviceable parts are inside. ANY modification of this device may alter defibrillator protection. Any modification to any part of this device is to be performed only by qualified service personnel. See also Chapter 4, “Maintaining the StressVue System.”

### StressVue System Requirements

The StressVue system comprises the following computer-related components:

- HP Compaq D510 or D530 convertible mini-tower
- HP L1702 17” flat panel monitor capable of 1280 x 1024 resolution
- StressVue thermal printer or HP 4200 Laser Jet printer

For StressVue to function properly, the following minimum specified system requirements must be met.

**Table F-1 StressVue system requirements**

Component	Minimum Hardware/Software Specifications
<b>Processor</b>	Intel Pentium 4 2.4GHz
<b>Memory</b>	256MB DDR RAM
<b>Hard disk</b>	40GB
<b>Video</b>	32MB graphics card, capable of 1280 x 1024 resolution
<b>Monitor</b>	17” LCD flat panel monitor, capable of 1280 x 1024 resolution
<b>Network</b>	100M NIC
<b>Operating system</b>	Microsoft Windows XP Professional, service pack 1
<b>Communication ports/ PCI slots</b>	Minimum of two RS 232 serial ports and one PCI slot

# Specifications

## StressVue System Specifications

**CAUTION** The system does not contain user-serviceable parts. Any modification of this device may alter defibrillator protection. Only qualified service personnel are authorized to modify any part of this device.

**Table F-2 StressVue system specifications**

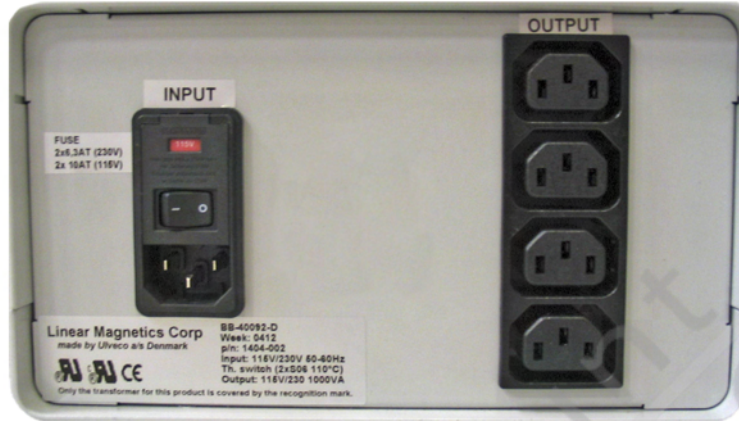
Function	Specifications
<b>Instrument type</b>	Exercise stress test system
<b>Isolation transformer power</b>	Input: 100-120 Vac @ 50/60 Hz Output: 100-120 Vac @ 50/60Hz  Input: 220-240 Vac @ 50/60 Hz Output: 220-240 Vac @ 50/60 Hz
<b>Standard leads</b>	I, II, III, aVR, aVL, aVF, V1, V2, V3, V4, V5, V6
<b>Display format</b>	Content, Display #1. Twelve 4 second rhythm leads displayed over 6 channels (10 seconds of continuous rhythm displayed)  Content, Display #2. <ul style="list-style-type: none"> <li>– Three, six or twelve 4-second rhythm leads</li> <li>Superimposed average complex for each of the 12 leads</li> <li>– Superimposed expanded average complexes</li> <li>– HR, METS, ST trends</li> <li>– 3-lead Rhythm strip events</li> </ul> Content, Display #3. <ul style="list-style-type: none"> <li>– Three, six or twelve 8-sec. rhythm leads</li> <li>– Superimposed average complex for each of the 12 leads</li> </ul> Sweep speed. 25mm/sec Size 17 in Resolution. Horizontal 1280 dots, vertical 1024 dots
<b>Rhythm display</b>	Up to 9 seconds of continuous rhythm
<b>ECG input</b>	Simultaneous input from all 12 leads



## Medical Isolation Transformer Specifications

The medical isolation transformers used with the StressVue system meet the following specifications.

**Figure F-1** Medical isolation transformer provided with StressVue



**Table F-3** Medical isolation transformer specifications

Function	Specifications
Frequency	50/60 Hz
Output Ratings	115V 1000VA or 230V 1000VA
Weight	22 lb (9.98 Kg)
Dimensions	Height. 5.1" (130mm) Width. 8.0" (203mm) Depth. 11.0" (280mm)
REF: 1404-102	Input 115VAC 50/60 Hz 2x10AT fused
REF: 1404-103	Input 230VAC 50/60 Hz 2x6.3AT fused

## StressVue Thermal Printer Specifications

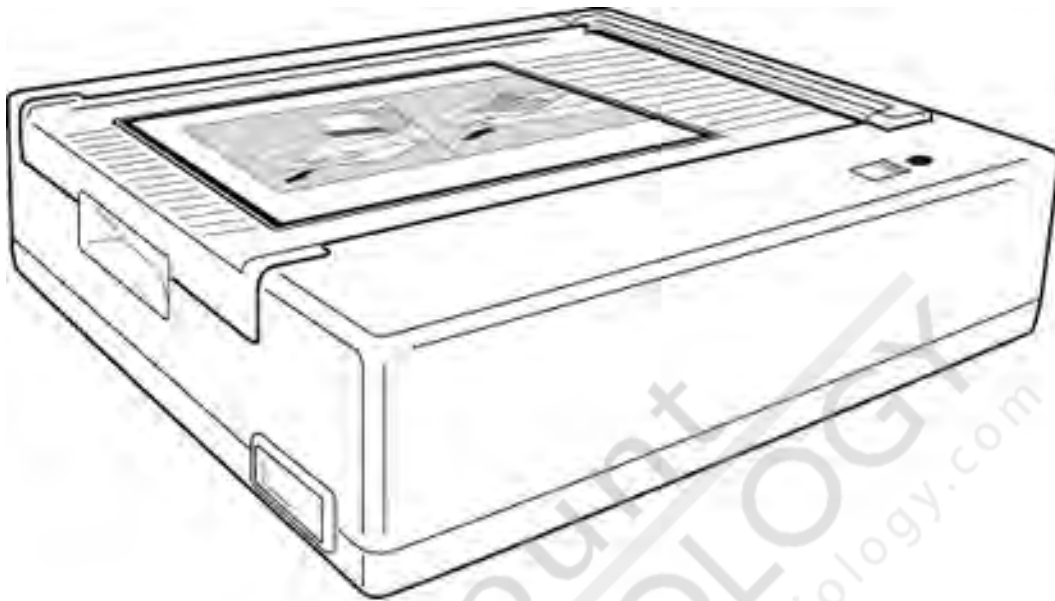


Figure F-2 StressVue thermal printer specification

Feature	Specification
<b>Instrument Type:</b>	Thermal printer
<b>Paper Type:</b>	8 ½ inch x 11 inch, cued, perforated, z-fold with full grid
<b>Recording Technique:</b>	Computer controlled, thermal dot array, 8 dots/mm
<b>Writer Speeds:</b>	5, 10, 25, or 50 mm/sec, computer controlled
<b>External Ports and Data Interfaces:</b>	<ul style="list-style-type: none"> <li>■ Networking capability to allow high speed data transfer for printing</li> <li>■ External RJ-45 connector</li> </ul>
<b>Chassis leakage current:</b>	Meet or exceed requirements of ANSI/AAMI EC11
<b>Power:</b>	100-240 VAC at 50/60 Hz
<b>Weight:</b>	9 pounds
<b>Dimensions H x W x D:</b>	4" x 16" x 13" (10 cm x 41 cm x 33 cm)
<b>Fuses:</b>	T-Type 1 Amp, 250 V
<b>Special Functions:</b>	LAN communication that provides continuous printing

# Glossary

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## **12-lead ECG**

The standard three-channel, four-lead group representation of the ECG.

## **4X standard gain**

*See* expanded average complex.

## **A analysis criteria**

Rules used by the computerized analysis program to interpret ECGs.

## **arrhythmia**

Irregularity of rhythm.

## **augmented lead**

(aVL, aVR, aVF) The difference between one site and the average of the potential of two other sites; unipolar extremity leads.

## **Auto Compare**

A 4X gain (expanded average) graphic of the current complex (green), and the reference complex (yellow). Auto Compare enhances the analysis of ST segment changes and other abnormalities.

## **B baseline drift**

The complexes are present, but the baseline wanders due to poor skin/electrode contact.

## **baseline ECGs**

An ECG used for comparison with another ECG for the same patient.

**C Cabrera report**

An alternative limb lead order in which aVR is inverted and shown as -aVR. Lead order is aVL, I, -aVR, II, aVF, III, V1 - V6.

**calibration pulse**

A 200 ms, 1 mV square wave pulse which appears on the printed record. Calibration pulse shows the sensitivity at which the ECG was recorded and may show the effect of the filters.

**COM ports**

Communication port. See *port*.

**configuration**

The parameters that provide the framework for an exercise test, such as exercise profile display rhythm leads, valid ST leads, and arrhythmia documentation.

**confirming MD**

The medical doctor (MD) who overreads an ECG and whose name appears on the report after you confirm it.

**D double product**

Heart rate multiplied by systolic blood pressure. An indirect measurement of oxygen demand.

**E ECG**

Also known as EKG. Acronym for electrocardiogram, which is the mathematical and graphical representation of the heart's electrical activity. Usually used in a collective way to refer to the ECG components: the waveform, the optional rhythm strip, and the analysis report.

**ECG waveform**

The line drawn by a cardiograph or other recording device to represent the heart's electrical activity.

**ergometer**

Bicycle. An apparatus for exercise/work.

**expanded average complex**

A four-times enlargement of the QRS complex that enables visual inspection of the ST segment (100mm/s, 40mm/mV) and other morphological changes.

**F** **fiducial tick mark**

Standard of reference; a mark.

**format**

How ECG waveforms are arranged on the printed ECG report.

**frequency response**

Bandwidth. The ability of a device to record transmitted frequencies.

**function keys**

The line of keys labeled F1 to F12 at the top of the keyboard.

**G** **gain**

An increase in amount, magnitude, or degree.

**J** **J point**

The end of the QRS complex; the point where the QRS ends and the ST segment begins (QRS offset).

**L** **LaserJet**

A printer you can use to print ECG reports from the system.

**learn**

The time during pre-exercise when StressVue develops the ECG average template.

**limb lead**

Bipolar lead that represents the difference of electrical potential between two selected sites (leads I, II, III).

**M** **measurements**

The amplitudes, durations, areas, and intervals that characterize the ECG waveform.

**muscle noise**

Grossly uneven baseline caused by patient body tremor or other muscle movement. The artifact may be so large that it overtakes the complex.

**O operator**

The person who operates the StressVue system. Also known as a technician (or “tech”).

**P port**

Usually datacomm port or serial port. The plug or jack on the system or cardiograph to which a cable or modem can be connected.

**PC**

Personal computer.

**phase**

A section or part of the StressVue exercise test.

**plot**

To print.

**precordial leads**

(V1-V6) Unipolar chest leads.

**Pre-exercise phase**

The initial part of the exercise test during which time the patient becomes acclimated to the treadmill and the baseline data (blood pressure; supine, standing, and hyperventilation ECGs) is acquired.

**premature ventricular complex (PVC)**

An arrhythmia that has its origination in the ventricle.

**protocol**

A type of exercise program consisting of predefined operating conditions (speed, grade, watts, automatic blood pressure, prompts and printouts). Examples: Bruce, Modified Bruce, Balke.

**Q QRS offset**

See J point.

**QRS onset**

The beginning of the QRS complex.

**R** **Report phase**

The final phase of the exercise test that includes various test reports and summary statistics.

**rhythm strip**

Term for ten second recording of a particular lead or leads that is printed at the bottom of an ECG report.

**Recovery phase**

The part of the exercise test immediately after exercise; a return to baseline.

**reference data**

Event data retained in memory that can be used to compare to current data.

**S** **spatial magnitude**

Absolute power of all 12 complexes. Used to determine QRS onset and QRS offset.

**stage**

One of several, timed sequences within a protocol.

**ST depression**

The amount of ST deviation below the baseline.

**ST level**

The numerical value of the measured ST point in microvolts.

**ST profile**

A bargraph containing current ST levels, and reference ST levels for all 12 leads. The baseline is 0 (zero) with each line representing 100 microvolts of change.

**ST segment**

Early ventricular repolarization. The end of the S wave (J-point) to the beginning of the T wave.

## T

**target heart rate**

The goal heart rate to be obtained during the exercise test.

**template**

The ECG pattern that is the basis for all other ECG comparisons.

**thermal printer**

The StressVue printer that uses thermal paper. Used to print ECG reports from the system.

**trace**

See *waveform*.

## W

**watt**

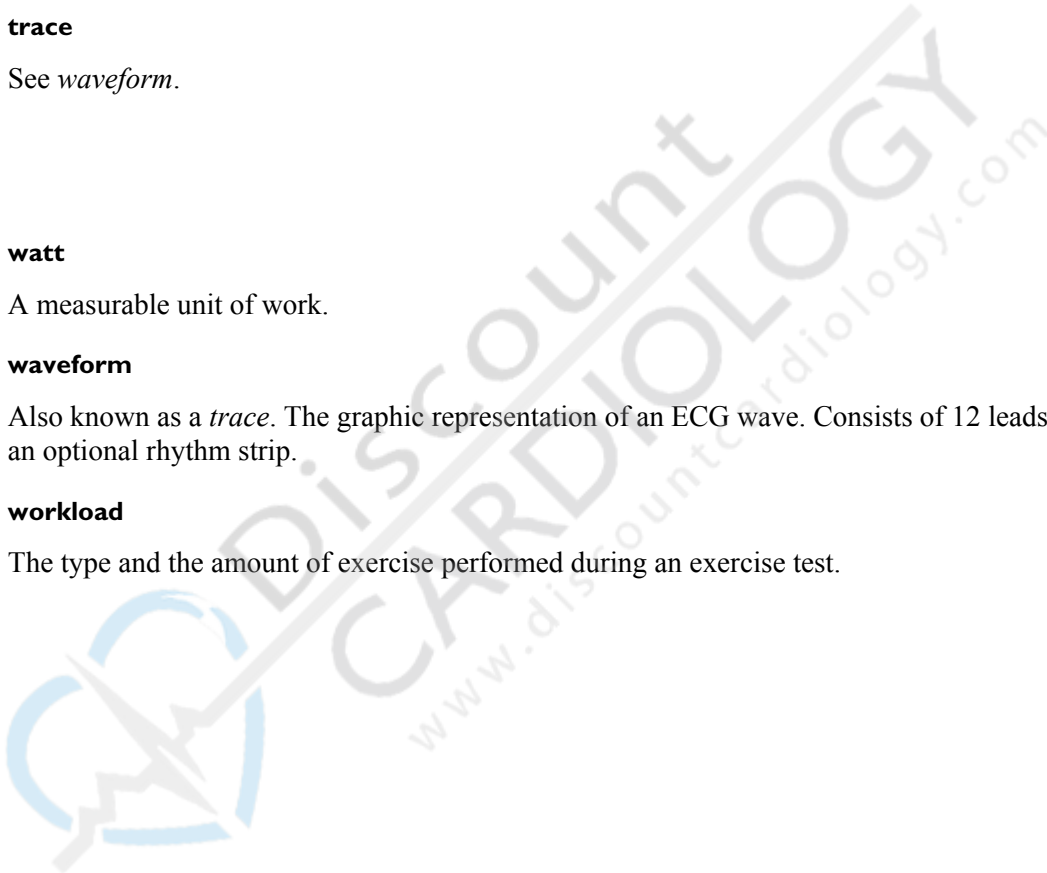
A measurable unit of work.

**waveform**

Also known as a *trace*. The graphic representation of an ECG wave. Consists of 12 leads plus an optional rhythm strip.

**workload**

The type and the amount of exercise performed during an exercise test.



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