GE Medical Systems
Information Technologies

MAC® 5000 Resting ECG Analysis System Operator's Manual

Software Version 007A

PN 2000657-057, Revision B

NOTE: The information in this manual only applies to MAC 5000 System software version 007A. It does not apply to earlier software versions. Due to continuing product innovation, specifications in this manual are subject to change without notice.

CE Marking Information

CE

Compliance

The MAC 5000 System bears CE mark CE-0459 indicating its conformity with the provisions of the Council Directive 93/42/EEC concerning medical devices and fulfills the essential requirements of Annex I of this directive. The product is in radio-interference protection class A in accordance with EN 55011.

For devices manufactured in the United States, the CE mark is applied under the authority of Notified Body GMED (0459).

The country of manufacture and appropriate Notified Body can be found on the equipment labeling.

The product complies with the requirements of standard EN 60601-1-2 “Electromagnetic Compatibility - Medical Electrical Equipment”.

The safety and effectiveness of this device has been verified against previously distributed devices. Although all standards applicable to presently marketed devices may not be appropriate for prior devices (i.e. electromagnetic compatibility standards), this device will not impair the safe and effective use of those previously distributed devices. See user's information.

Exceptions

There are no exceptions.

For your notes

Contents

1 Introduction

For your notes

Manual Information

Purpose

This manual contains the instructions necessary to operate the MAC 5000 system in accordance with its function and intended use.

Intended Audience

This manual is intended for the person who uses, maintains, or troubleshoots this equipment.

Revision History

Each page of the document has the document part number and revision letter at the bottom of the page. The revision letter identifies the document's update level.

Table 1. Revision History, PN 2000657-057

Revision	Date	Comment
A	27 June 2002	Initial release.
B	1 February 2003	Added information for the MobileLink wireless option.

Conventions

Note

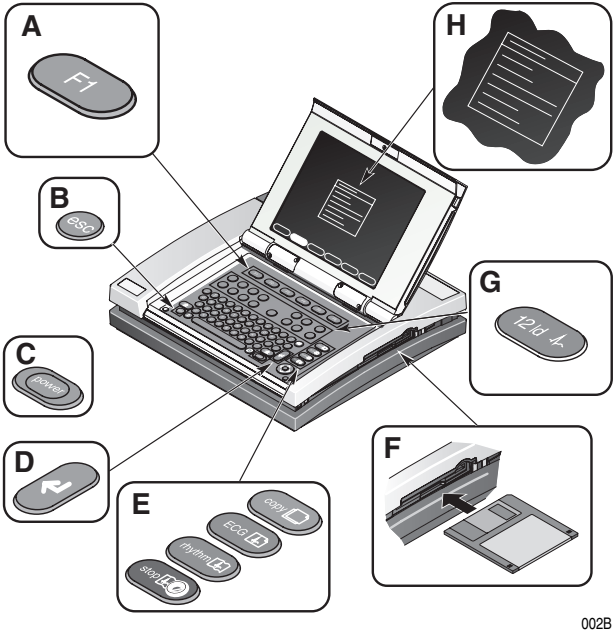
✓ Provides additional user information.

Styles

Bold text	Indicates keys on the keyboard, text to be entered, or hardware items such as buttons or switches on the equipment.
Italicized text	Indicates software terms that identify menu items, buttons, or options in various windows.
Ctrl+esc	Indicates a keyboard operation. A (+) sign between the names of two keys indicates that you must press and hold the first key while pressing the second key once. For example, "Press **Ctrl+esc**" means to press and hold down the **Ctrl** key while pressing the **esc** key.
<Space>	Indicates you must press the spacebar. When instructions are given for typing a precise text string with one or more spaces, the point where the spacebar must be pressed is indicated as: **<Space>**. The purpose of the < > brackets is to ensure you press the spacebar when required.
Enter	Indicates you must press the "**Enter**" or "**Return**" key on the keyboard. Do not type "enter".

User Instructions

Pictures show you which key to press, screen item to select, or action you must do to complete a task.



	Your Action
A	Press the **F** key located below the desired screen menu item.
B	Press to close a screen menu.
C	Press to turn the system power on or off as indicated in the procedure.
D	Press to enter data into the system.
E	Press to acquire ECG data and to print or stop printing writer reports.
F	Insert or remove a diskette as indicated by the direction of the arrow.
G	Press to perform various exercise test functions and adjust test variables.
H	Select the displayed screen item.

Safety Information

Definitions

The terms danger, warning, and caution are used throughout this document to point out hazards and to designate a degree or level of seriousness. Familiarize yourself with their definitions and significance.

DANGER
Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

WARNING
Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.

CAUTION
Indicates a potentially hazardous situation which, if not avoided may result in minor or moderate injury.

Equipment

The safety statements presented in this chapter refer to the equipment in general and, in most cases apply to all aspects of the equipment. There are additional safety statements in the document's chapters that are specific to that chapter.

DANGER
Do NOT use in the presence of flammable anesthetics.

WARNINGS

Do NOT contact unit or patient during defibrillation.

This is class I equipment. The mains plug must be connected to an appropriate power supply.

Operate the unit from its battery if the integrity of the protective earth conductor is in doubt.

Interpretation hazard. A qualified physician must overread all computer-generated tracings. Computerized interpretation is only significant when used in conjunction with clinical findings.

Avoid rapid changes in treadmill speed and/or grade during a stress test.

ACCIDENTAL SPILLS - To avoid electric shock or device malfunction, liquids must not be allowed to enter the device. If liquids have entered the device, take it out of service and have it checked by a service technician before it is used again.

EXPLOSION HAZARD - Do not use this equipment in the presence of flammable anesthetics, vapors, or liquids.

CAUTIONS

U.S. Federal law restricts this device to sale by or on the order of a physician.

This equipment contains no user serviceable parts. Refer servicing to qualified service personnel.

EMC - Magnetic and electrical fields are capable of interfering with the proper performance of the device. For this reason make sure that all external devices operated in the vicinity of the device comply with the relevant EMC requirements. X-ray equipment or MRI devices are possible sources of interference as they may emit higher levels of electromagnetic radiation.

Legal Notice

Our equipment contains several fields which can be filled in before performing an ECG. Some of these fields must be filled in before performing an exam, some are optional and therefore left to the user to assess whether they are needed to perform the exam. A field *RACE* is one of these optional fields. It has been acknowledged by the medical profession as useful to analyze some pathologies. You should be aware that, in some jurisdictions, the processing of data revealing an individual's racial origin is subject to legal requirements, such as obtaining the patient's prior consent. If you elect to collect this type of data, it is your responsibility to ensure that you comply with all applicable legal requirements.

Responsibility of the Manufacturer

GE Medical Systems *Information Technologies* is responsible for the effects of safety, reliability, and performance only if:

- Assembly operations, extensions, readjustments, modifications, or repairs are carried out by persons authorized by GE Medical Systems *Information Technologies*.
- The electrical installation of the relevant room complies with the requirements of the appropriate regulations.
- The equipment is used in accordance with the instructions for use.

General Information

Intended Use

The intended use of this device is to record ECG signals from surface ECG electrodes. This device can analyze, record, and store electrocardiographic information from adult and pediatric populations. This data can then be computer analyzed with various algorithms such as interpretive ECG and signal averaging for presentation to the user.

This device is intended for use under the direct supervision of a licensed health care practitioner.

This device is not intended for use with high frequency surgical units. Disconnect the patient from the device before using the high frequency surgical unit.

This equipment uses a computerized ECG analysis program which can be used as a tool in ECG tracing interpretation.

To ensure accuracy, only use computer-generated tracings and not the display for physician interpretation.

This equipment will not cause abnormal operation of a patient's pacemaker or other electronic stimulator.

The Acute Cardiac Ischemia–Time Insensitive Predictive Instrument (ACI-TIPI) Option is intended to be used in a hospital or clinical environment by competent health professionals. ACI-TIPI uses recorded ECG data to produce a numerical score which is the predicted probability of acute cardiac ischemia. Like any computer-assisted ECG interpretation program, the GE Medical Systems *Information Technologies* ACI-TIPI evaluation and probability score is intended to supplement, not substitute for, the physician's decision process. It should be used in conjunction with knowledge of the patient's history, the results of a physical examination, the ECG tracing, and other clinical findings.

ACI-TIPI is intended for adult patient populations.

This system is not intended to be used as a vital signs physiological monitor.

Recording ECGs During Defibrillation

This equipment is protected against the effects of cardiac defibrillator discharge to ensure recovery, as required by test standards.

The patient signal input of the acquisition module is defibrillation-proof. Therefore, it is not necessary to remove the ECG electrodes prior to defibrillation.

When using stainless steel or silver electrodes a defibrillator discharge current may cause the electrodes to retain a residual charge causing a polarization or dc offset voltage. This electrode polarization will block acquisition of the ECG signal. To avoid this condition, use non-polarizing electrodes (which will not form a dc offset voltage when subjected to a dc current) such as silver/silver-chloride types if there is a situation where there is a likelihood that a defibrillation procedure will be necessary.

If polarizing electrodes are used, we recommend disconnecting the leadwires from the patient before delivering the shock.

Electrode defibrillation recovery is the ability of the electrode to allow the ECG trace to return after defibrillation. We recommend using non-polarizing disposable electrodes with defibrillation recovery ratings as specified in AAMI EC12 3.2.2.4. (MMS P/N 9623-105 Silver MacTrodes, MMS spec. TP9623-003). AAMI EC12 requires that the polarization potential of an electrode pair does not exceed 100mV, 5 seconds after a defibrillation discharge.

Accuracy of the Input Signal Reproduction

- Overall System Error is tested using the method described in AAMI EC11 3.2.7.1. Overall System Error is +5%.
- Frequency Response is tested using the method described in AAMI EC11 3.2.7.2 methods A and D.

Modulating Effects in Digital Systems

This device uses digital sampling techniques that may produce some variation in amplitudes of Q, R, and/or S waves from one heart beat to the next, which may be particularly noticeable in pediatric recordings. If this phenomenon is observed, the clinician should be aware that the origin of amplitude variations is not entirely physiologic. For measuring voltages of Q, R, and S waves, it is advisable to use the QRS complexes with the largest deflection of the particular waves.

Installation and Connection

If the installation of this equipment, in the USA, will use 240 V rather than 120 V, the source must be a center-tapped, 240 V, single-phase circuit.

Contact GE Medical Systems *Information Technologies* for information before connecting any devices to this equipment that are not recommended in this manual.

Parts and Accessories

To ensure patient safety, use only parts and accessories manufactured or recommended by GE Medical Systems *Information Technologies*.

Parts and accessories used must meet the requirements of the applicable IEC 601 series safety standards, and/or the system configuration must meet the requirements of the IEC 60601-1-1 medical electrical systems standard.

The use of ACCESSORY equipment not complying with the equivalent safety requirements of this equipment may lead to a reduced level of safety of the resulting system. Consideration relating to the choice shall include:

- use of the accessory in the PATIENT VICINITY; and
- evidence that the safety certification of the ACCESSORY has been performed in accordance to the appropriate IEC 60601-1 and/or IEC 60601-1-1 harmonized national standard.

Equipment Symbols

Type BF equipment. The acquisition module is protected from defibrillation shocks.

Alternating current.

Equipotential.

Charge the battery. The flashing amber LED next to this symbol indicates you must connect the system to AC power to re-charge the battery.

Do NOT throw the battery into the garbage.

Recycle the battery.

Consult accompanying documents.

This position of the switch removes battery power from the equipment.

Classified with respect to electric shock, fire, mechanical, and other specified hazards only in accordance with UL 2601-1, CAN/CSA C22.2 No. 601-1, CAN/CSA C22.2 No. 601-2-25, EN 60601-2-25, EN 60601-1-1.

CAUTION

To reduce the risk of electric shock, do NOT remove cover (or back). Refer servicing to qualified personnel.

098A, 096A, 108A, 101A, 102A, 103A, 100A, 181A, 099A

Service Information

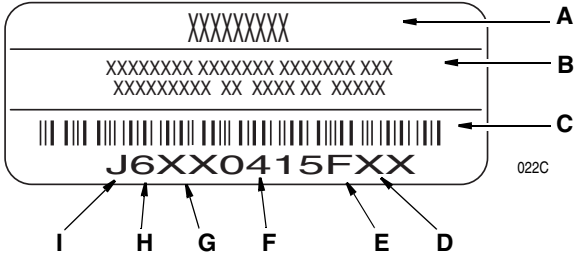
Service Requirements

Refer equipment servicing to GE Medical Systems *Information Technologies* authorized service personnel only. Any unauthorized attempt to repair equipment under warranty voids that warranty.

It is the user's responsibility to report the need for service to GE Medical Systems *Information Technologies* or to one of their authorized agents.

Equipment Identification

Every GE Medical Systems *Information Technologies* device has a unique serial number for identification. The serial number appears on the device label.



	Description
A	name of device
B	manufacturer
C	serial number
D	device characteristics
E	division
F	product sequence number
G	product code
H	year manufactured
I	month manufactured

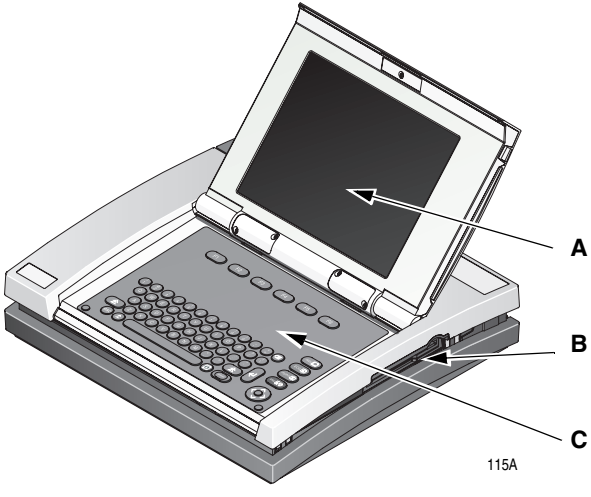
✓ The product code for the MAC 5000 system is MP.

2 Equipment Overview

For your notes

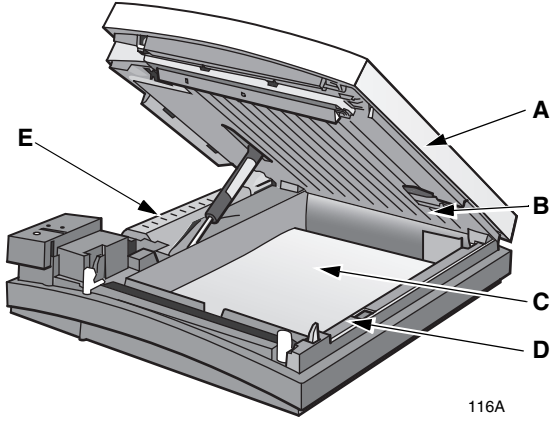
Equipment Description

Front View



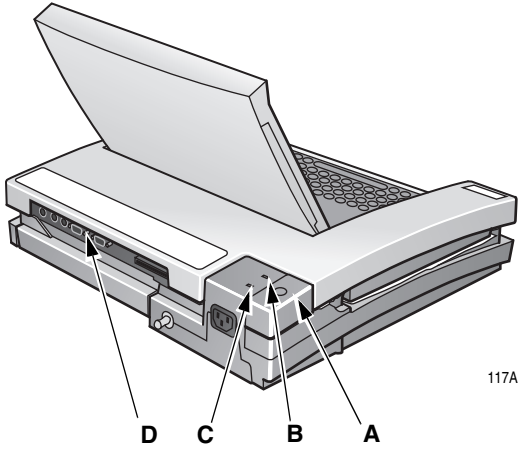
	Name	Description
A	display screen	View the waveform and text data.
B	disk drive slot	Insert a diskette to store ECG orders or recorded ECG data.
C	keyboard	Press the keyboard keys to control the system or to enter data.

Internal View



	Name	Description
A	writer door	Open to replace paper or the battery.
B	acquisition module connector	Connect the acquisition module cable here.
C	paper tray	Place paper here.
D	**STD** or **A4**	Indicates the size of paper (standard or A4) the tray holds.
E	battery	Recharge when the screen battery symbol flashes.

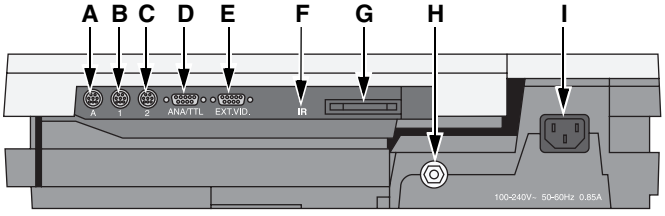
Back View



	Name	Description
A	internal access button	Press down to open the system to change paper or the battery.
B	amber battery light	Indicates the battery is re-charging.
C	green AC power light	Indicates the system is connected to AC power.
D	back panel connectors	Connect peripheral devices here.

Connectors

Back Panel



118A

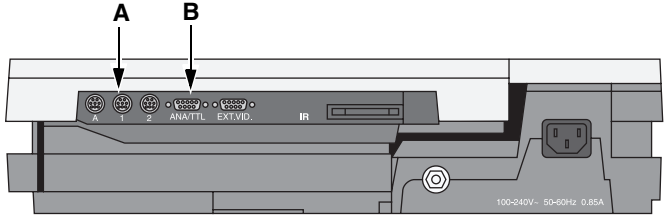
WARNINGS

Keep leakage current within acceptable limits when connecting auxiliary equipment to this device.

Total system leakage current must not exceed 100 microamperes.

	Name	Description
A	**A**	Connect an optional card reader.
B	**1**	Connect a GE Medical Systems *Information Technologies* KISS pump.
C	**2**	Connect a local transmission cable, serial line, or client bridge (wireless option).
D	**ANA/TTL**	Connect a device requiring analog data or TTL trigger.
E	**EXT.VID.**	Connect an external video display.
F	**IR**	Point at a MAC 5000 or MUSE CV system's **IR** transceiver to transmit or receive ECG data.
G	card slot	Insert the system card into this slot to run the system.
H	ground lug	Connect non-grounded peripheral devices to ensure equipotential.
I	mains AC power	Insert the mains AC power cable.

Back Panel (Exercise Option)



118A

	Name	Description
A	**1**	Connect a T2000 treadmill or external blood pressure device cable to this port.
B	**ANA/TTL**	Connect an analog treadmill, ergometer cable or TTL trigger to this port.

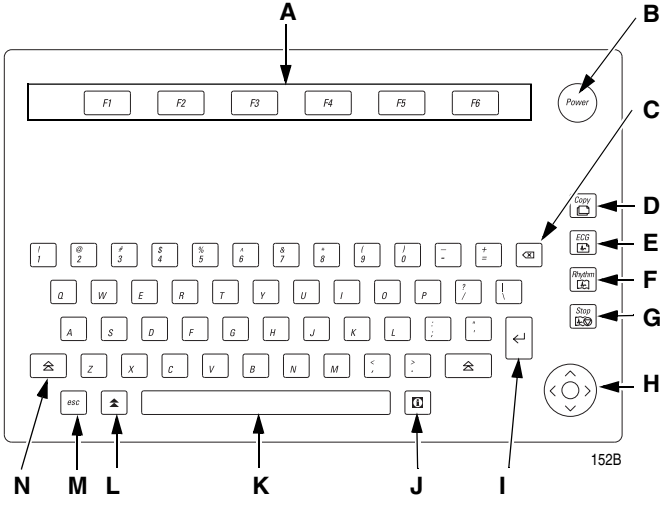
✓ Ergoline bicycle ergometers require connections to both ports.

WARNINGS

Keep leakage current within acceptable limits when connecting auxiliary equipment to this device.

Total system leakage current must not exceed 100 microamperes.

Keyboard

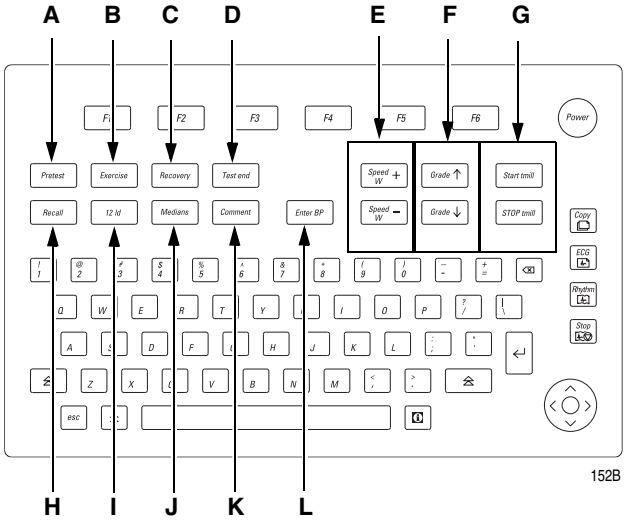


✓ Your keyboard may be slightly different than that shown.

	Name	Description
A	function keys	Selects screen menu functions.
B	**Power**	Powers the system on or off.
C	delete	Erases typed characters.
D	**Copy**	Prints another ECG report.

	Name	Description
E	**ECG**	Acquires an ECG. Press to acquire a 12SL resting ECG, including measurements and interpretation.
F	**Rhythm**	Prints continuous ECG data. This data cannot be stored or transmitted.
G	**Stop**	Stops the writer from printing.
H	arrow pad	Moves the cursor left, right, up, or down. Press the center to select a highlighted menu or screen item.
I	return	Enters information into the system.
J	information	Provides additional user information.
K	space bar	Adds a space between typed characters or highlights screen items.
L	option	Not functional at this time.
M	**esc**	Returns you to a previous menu.
N	shift	Creates a capital letter. Press shift+**k** to type a capital **K**.

Keyboard–Exercise Test Keys (Option)

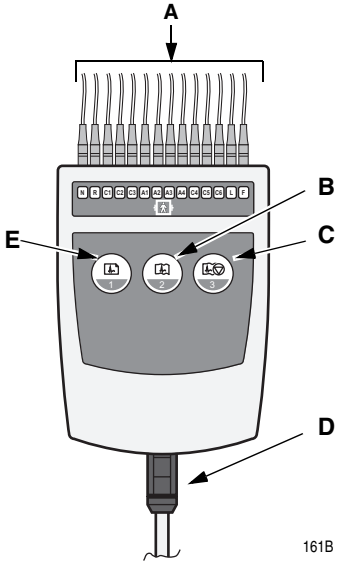


✓ Your keyboard may be slightly different than that shown.

	Name	Description
A	**Pretest**	Press to advance to the pretest phase*.
B	**Exercise**	Press to advance to the exercise phase*.
C	**Recovery**	Press to advance to the recovery phase*.
D	**Test end**	Press and hold to end the test and start the test end phase.
E	**Speed W+/–**	Press to manually change the belt speed or ergometer load.
F	**Grade** up/down	Press to change the elevation of the treadmill belt.
G	**Start/STOP tmill**	Press to start or stop the treadmill during the test.
H	**Recall**	Press to print a 10-second delayed recall report.
I	**12 ld**	Press to print a 12 lead report (10 seconds of acquired data).
J	**Medians**	Press to print a medians report.
K	**Comment**	Press to enter comments about the test. Comments are printed on many of the final reports.
L	**Enter BP**	Press to enter BP readings or to trigger a reading from an external device.

*Or advance to next stage within the selected phase.

Acquisition Module



	Name	Description
A	leadwires	Attach to the patient's electrodes. The acquisition module uses either 10 or 14 leadwires.
B	rhythm button	Press to print a rhythm strip.
C	stop writer button	Press to stop the writer from printing.
D	acquisition module cable	Insert into the system's internal acquisition module connector.
E	ECG button	Press to record an ECG.

✓ If you enable the *Preview before analysis* function, press (E) to view the data. Then, either press (E) again to analyze the data or press (C) to discard the data.

WARNING

To ensure defibrillator protection and protection against high-frequency burns, use only the CAM-14 acquisition module with this equipment. Otherwise, serious injury could result.

Lead Labels

One of the following lead labels may appear on the acquisition module.

10 Lead AHA

14 Lead AHA

14 Lead AHA Pediatric

10 Lead IEC

204A

14 Lead IEC

14 Lead IEC Pediatric

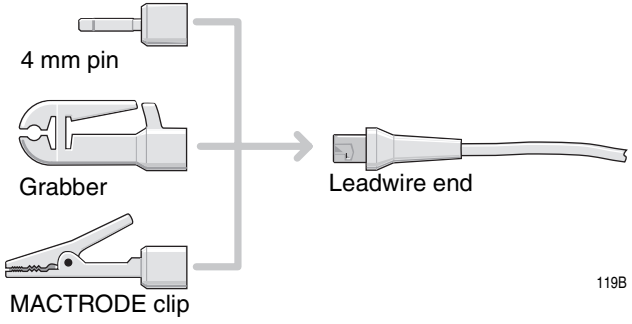
14 Lead AHA AUX

14 Lead IEC AUX

205A

Leadwire Adapters

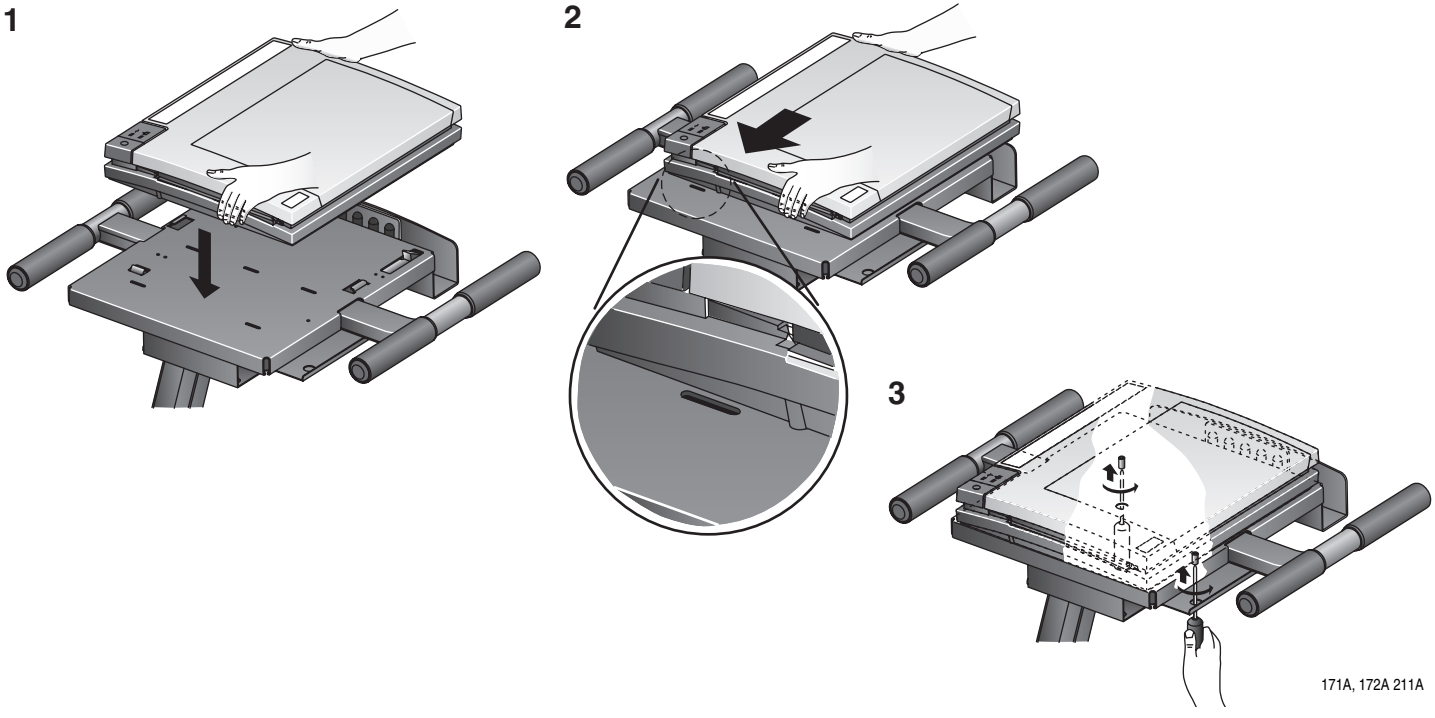
The MULTI-LINK leadwires require an adapter to connect to an electrode.



Getting Started

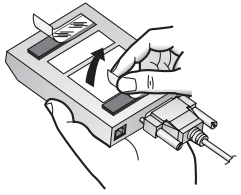
Prepare the Equipment for Use

Mount the System to the Trolley (Option)



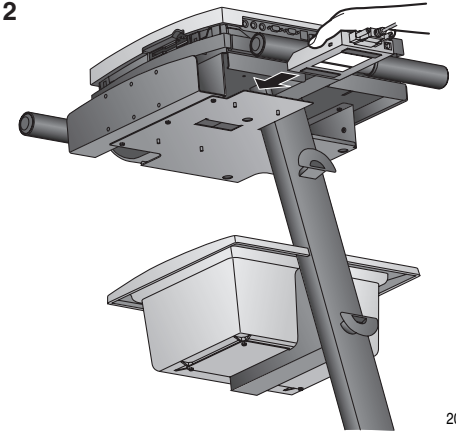
Mount the Modem to the Trolley (Modem Option)

1



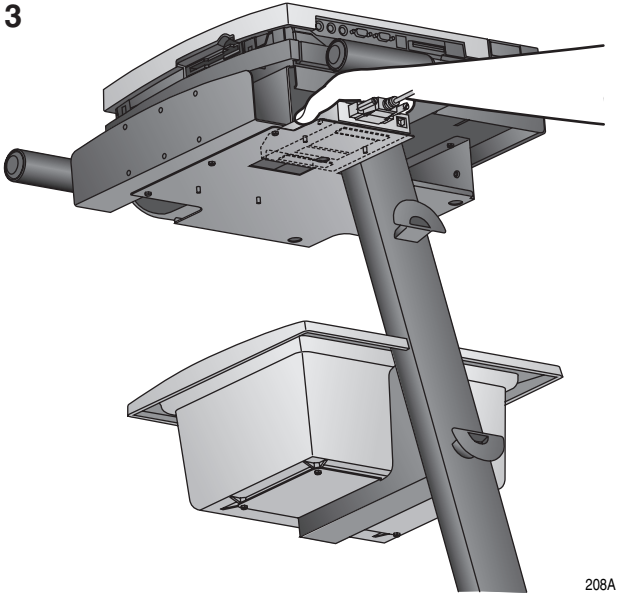
206A

2



207A

3



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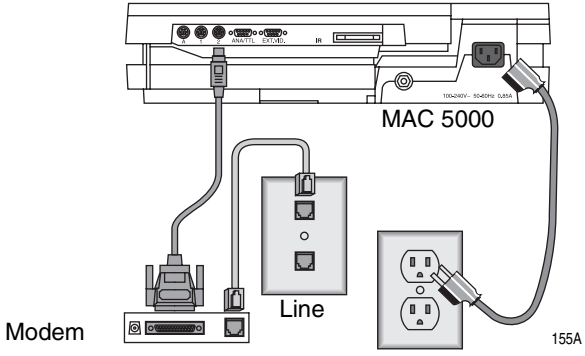
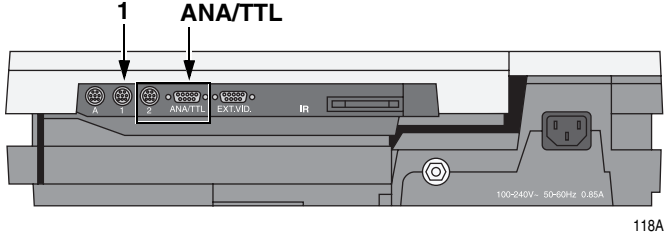
Connect the System Cables (Modem Option)



✓ GE Medical Systems *Information Technologies* recommends using an external modem.
Contact GE Medical Systems *Information Technologies* for information on the recommended modem.

WARNING
This is Class I equipment. The mains plug must be connected to an appropriate power supply.

Connect cables to the **1** and/or **ANA/TTL**.



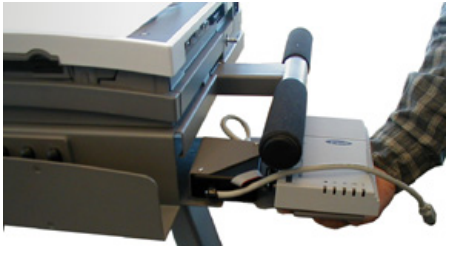
WARNINGS
Keep leakage current within acceptable limits when connecting auxiliary equipment to this device.

Total system leakage current must not exceed 100 microamperes.

Mount the Client Bridge to the Trolley (Wireless Option)

✓ The wireless option is available only in the United States.

1



2

3

259A, 260A, 261A

Connect the System Cables (Wireless Option)

262A

Connect cable labeled **COM2** to **COM2** port on the MAC 5000 back panel.

WARNINGS

Keep leakage current within acceptable limits when connecting auxiliary equipment to this device.

Total system leakage current must not exceed 100 microamperes.

Connect External Devices (Exercise Option)

Your MAC 5000 system can connect at port **1** with the following devices:

- GE Medical Systems *Information Technologies* Series T2000 treadmills,
- SunTech Tango blood pressure device,
- Colin STBP-780 blood pressure device, or
- Ergoline 900/900L integrated blood pressure device.

✓ Before using external devices the MAC 5000 must be properly set up (see Chapter 14, "Defining the System Setup") and exercise protocols must be properly defined (see Chapter 7, "Edit Protocols Options").

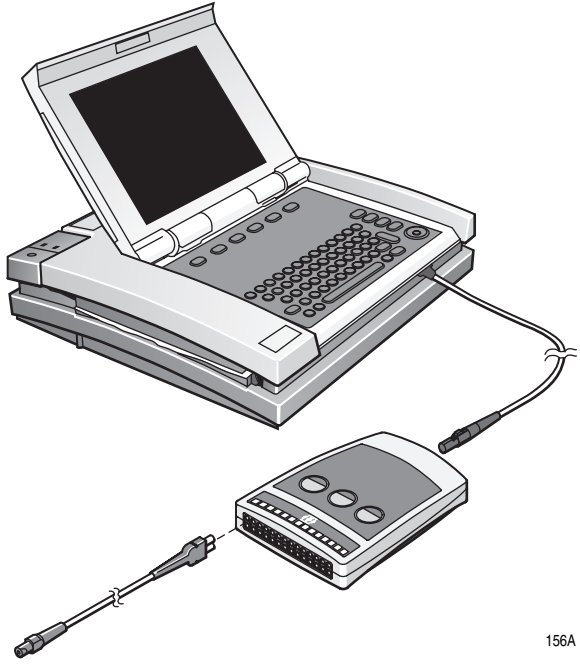
Your MAC 5000 system can connect at the **ANA/TTL** port with the following devices:

- The Ergoline 800 ergometer.
- The Ergoline 900 ergometer.
- The Lode ergometer.

✓ Other bicycle ergometers and treadmill models with an analog port can be connected to the analog output of the MAC 5000.

✓ A TTL QRS trigger signal for external devices can be connected to the **ANA/TTL** port.

Connect the Acquisition Module Cables



156A

Verify Correct Operation

power

Does the system start up without displaying error messages?

Yes

The system is operational.

No

power

power

Are the errors resolved?

Yes

The system is operational.

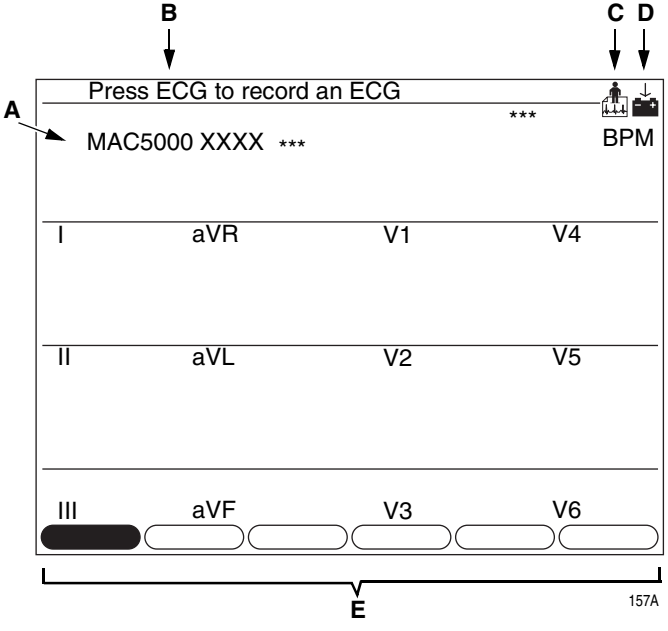
No

Contact GE Medical Systems *Information Technologies* Service.

006A, 150A

Software Description

Start Up Screen

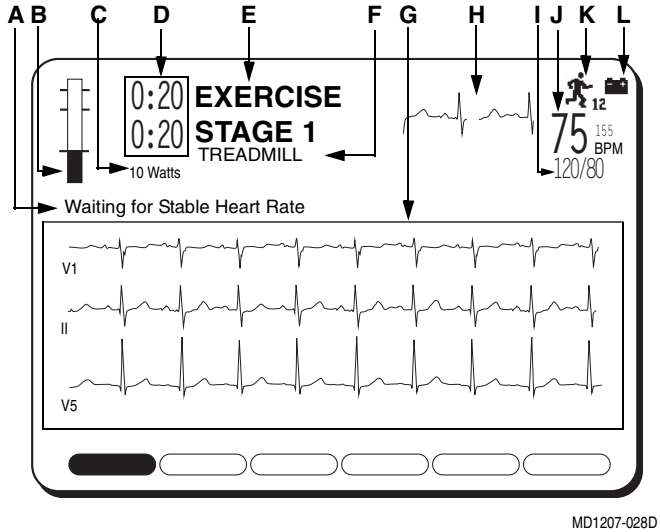


	Name	Description
A	software version	Displays the system's software version during the first few seconds of power up.
B	user prompts	Provides additional information.
C	function icon	Indicates the *Main Menu* function the system is using. This is the *Resting ECG* function.
D	battery status icon	Indicates how much charge the battery has available.
E	menu	Provides access to additional settings or functions.

Main Menu

Use the *Main Menu* to select the different functions available on this system. The functions displayed in your *Main Menu* may vary due to the installation of purchased software options.

Start Up Screen (Exercise Option)



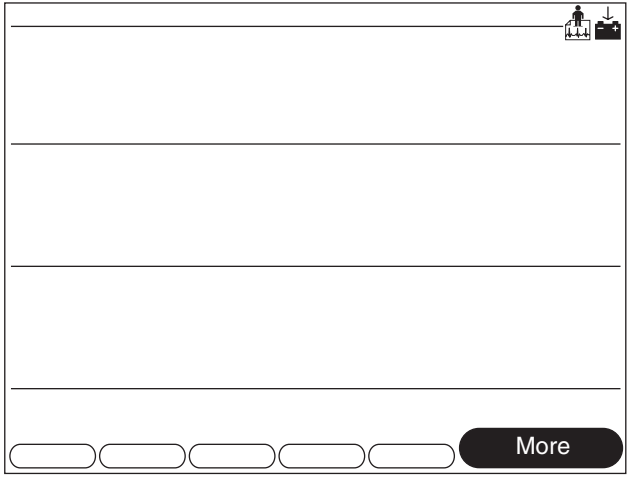
	Name	Description
A	system messages	Error or informational messages appear in this area.
B	current heart rate bar graph	The top horizontal line is the maximum predicted heart rate (220 - age). The line below that is the target heart rate (a percentage of 220 - age). At the start of *EXERCISE* phase, a third line representing the resting heart rate will appear.

	Name	Description
C	workload level	Indicates the units of measurement and can be changed.
D	phase and stage clocks	The top clock displays the total time in a phase. The bottom clock displays the time in a stage. During the *TEST-END* phase, the top clock displays the total time in the *EXERCISE* phase and the bottom clock displays the total time in the *RECOVERY* phase.
E	current phase and stage name	Top is phase name, bottom it stage name.
F	protocol name	
G	Rhythm formats	Use *System Setup* (see Chapter 14, "Defining the System Setup") or *Ld Select* to change the leads displayed and printed.
H	medians	*Current*, *pretest*.
I	systolic/ diastolic blood pressures	The *BP* numbers become dim if the *BP* has not changed in over one minute.
J	current heart rate	Determined by the three leads displayed on your screen during the *PRE-TEST* phase.
K	function icon	Indicates the *Main Menu* function the system is using. This is the *Exercise* function.
L	battery status icon	Indicates how much charge the battery has available.

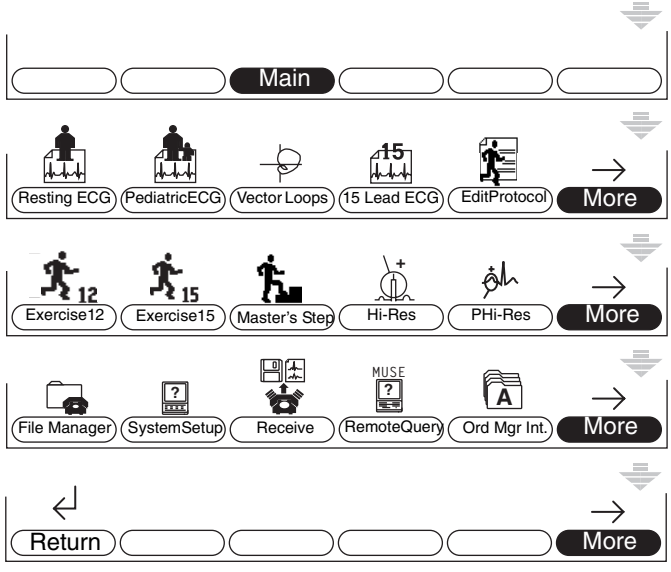
Main Menu

Use the *Main Menu* to select the different functions available on this system. The functions displayed in your *Main Menu* may vary due to the installation of purchased software options.

Select *More* from the start up screen, then select *Main Menu* to begin displaying the *Main Menu* functions.



180A



182A

Main Menu Functions

Function	Description
 076A *Resting ECG*	Records a 12-lead ECG.
 077A *PediatricECG*	Records a 15-lead pediatric ECG. The standard 12 leads and the V3R, V4R, and V7 leads are used.
 078A *Vector Loops*	Records a 15 lead vectorcardiogram. The standard 12 leads and the X,Y,Z leads are used.
 085A *15 lead ECG*	Records an adult 15 lead ECG. The standard 12 leads and three user-defined leads are used.
 250A *EditProtocol*	*EditProtocol* creates new or edits existing exercise test protocols. Also, a protocol can be saved, printed, or erased.
 251A *Exercise12*	*Exercise12* conducts the 12-lead exercise test and allows you to print reports.

Function	Description
 252A *Exercise15*	*Exercise15* conducts the 15-lead (12 standard, 3 user defined leads) exercise test and allows you to print reports.
 253A *Master's Step*	Runs the *Master's Step* exercise protocol. (Japan only.)
 079A *Hi-Res*	Records a signal-averaged high-resolution ECG. This is a purchased option.
 084A *PHi-Res*	Records a p-wave signal-averaged high-resolution ECG. This is a purchased option.
 080A *File Manager*	Prints, edits, displays, transmits, and deletes ECG data stored to a disk.
 082A *SystemSetup*	Defines the operating parameters of the system.
 081A *Receive*	Receives ECG data from other devices.

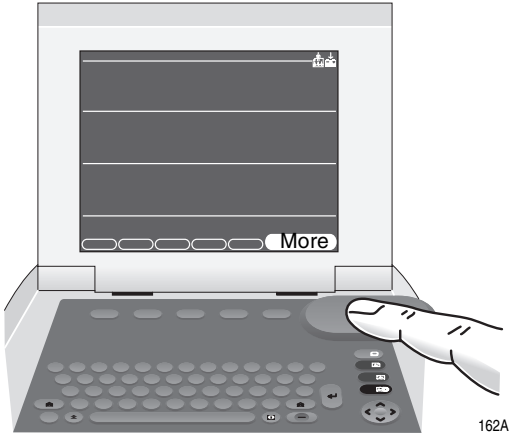
Function	Description
083A *RemoteQuery*	Displays and prints confirmed ECGs retrieved from a MUSE CV system. This is a purchased option.
086A *Ord Mgr Int.*	Acquires, prints, and stores ECG orders received from a MUSE CV system with a Hospital Information System (HIS) interface.

Selecting Menu Functions

The following shows two methods for selecting a menu function.

Pressing a Function Key

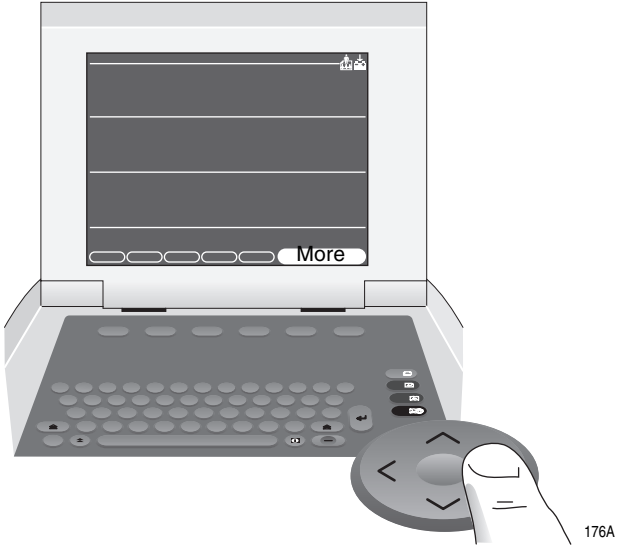
To select *More*, press the function key directly below *More*.



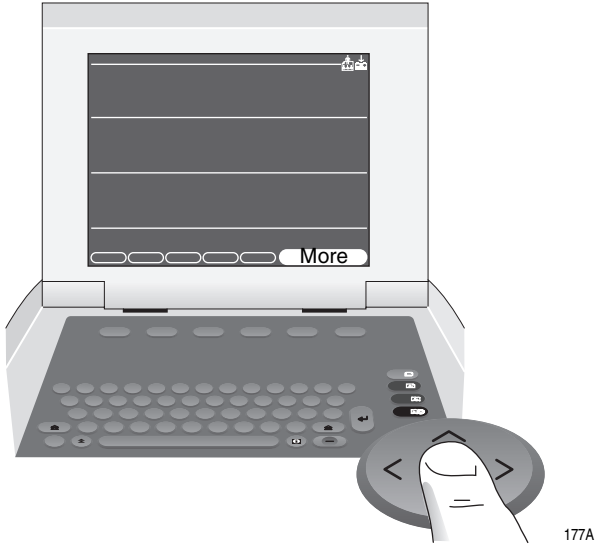
Using the Arrow Pad

To select *More*:

1. Press the right arrow until *More* is highlighted.

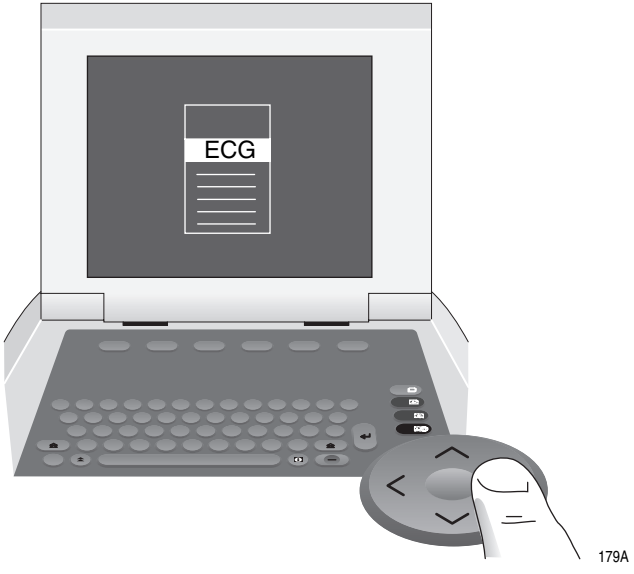


2. Press the middle of the pad to select *More*.



To select ECG:

1. Press the right arrow to highlight *ECG*.

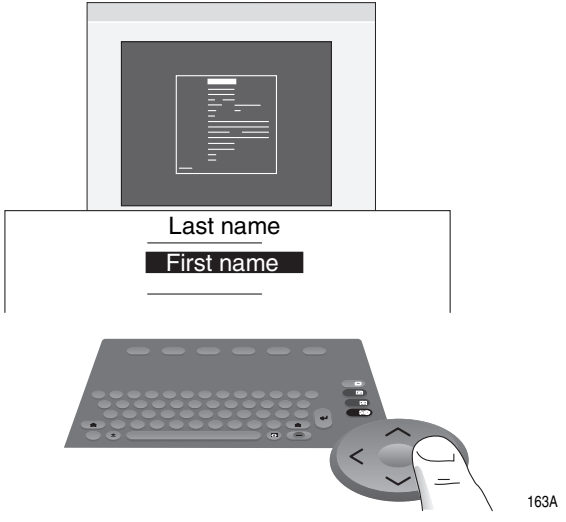


2. Press the middle of the pad to select *ECG*. The system displays the next screen.

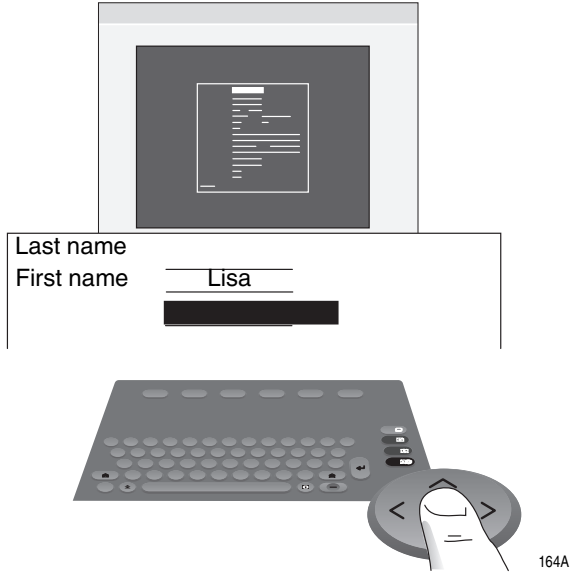
Entering Data

Type Data into a Highlighted Field

1. Press the right arrow to highlight the *First name* field.

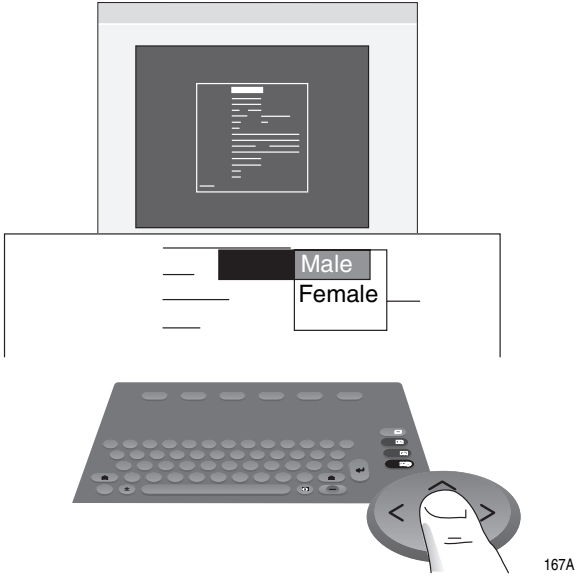


2. Type the patient's first name.
3. Press the middle of the pad to enter the information. The cursor goes to the next data field.

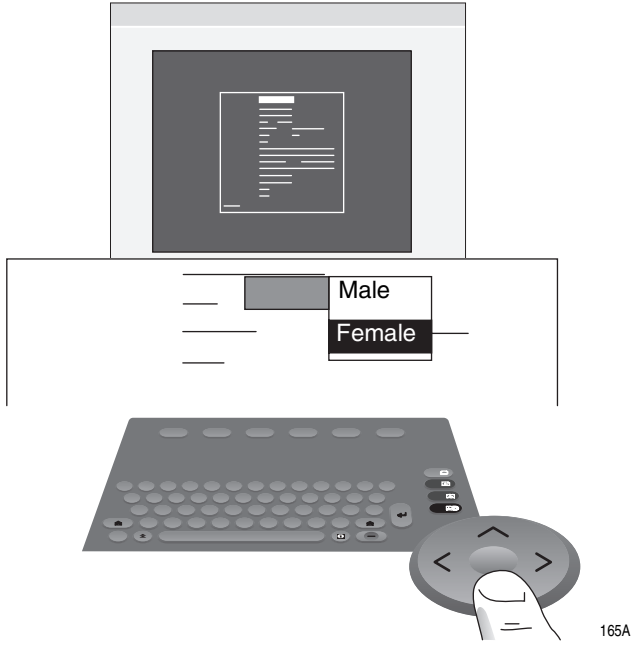


Selecting Items from a List

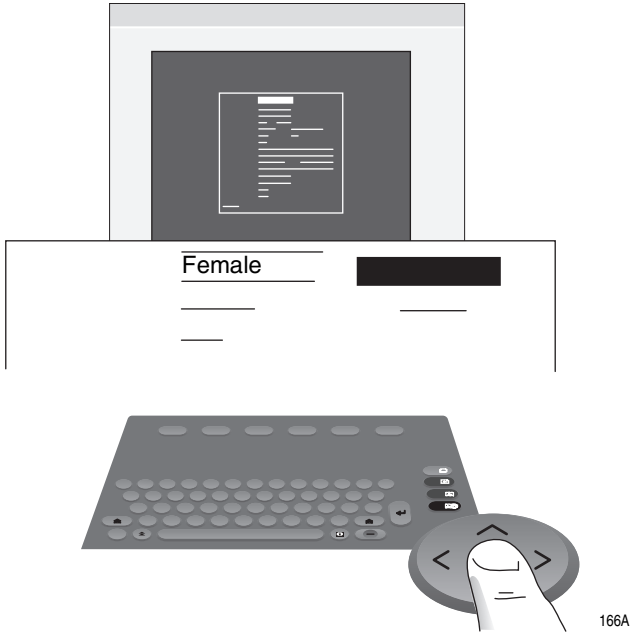
1. Press the right arrow to highlight *Gender*.
2. Press the middle of the pad to lock the list in place.



3. Press the down arrow to highlight *Female*.



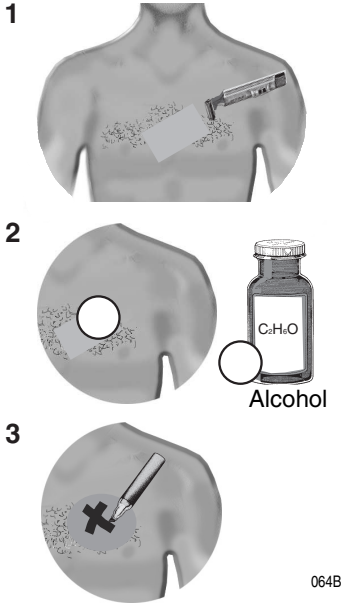
4. Press the middle of the arrow pad to select *Female*. The cursor goes to the next data field.



3 Preparing the Patient

For your notes

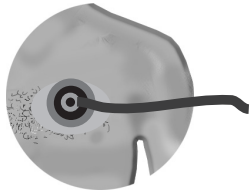
Prepare the Patient's Skin



✓ To use the KISS Electrode Application System, see the KISS operator's manual for instructions. (The KISS system is not available for sale in the U.S.)

4  Use an abrasive pad to remove the epidermal skin layer at each electrode site

5



6 Use a skin preparation analyzer to test each electrode site for good conductivity.

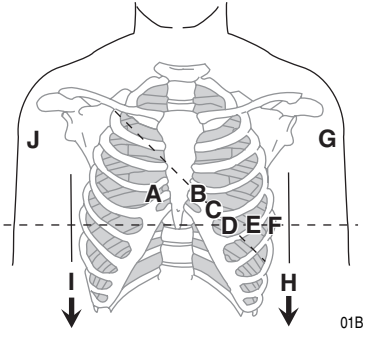
WARNING

Keep the conductive parts of lead electrodes and associated parts away from other conductive parts, including earth.

Apply the Electrodes

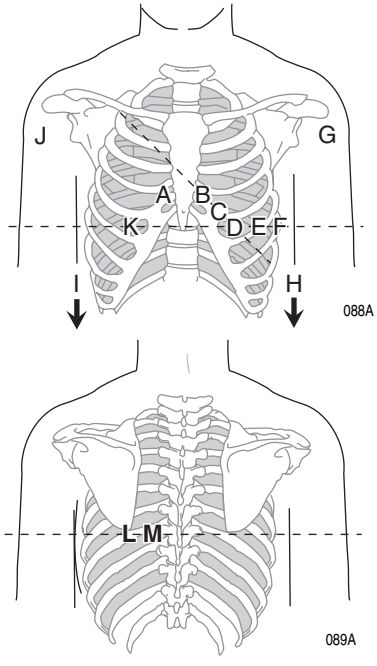
Resting Electrodes

Standard 12 Lead Placement



	AHA Label	IEC Label	Electrode Placement
A	V1 red	C1 red	Fourth intercostal space at the right sternal border.
B	V2 yellow	C2 yellow	Fourth intercostal space at the left sternal border.
C	V3 green	C3 green	Midway between location B and D.
D	V4 blue	C4 brown	Mid-clavicular line in the fifth intercostal space.
E	V5 orange	C5 black	Anterior axillary line on the same horizontal level as D.
F	V6 purple	C6 purple	Mid-axillary line on the same horizontal level as D and E.
G	LA black	L yellow	Right and left deltoids.
H	LL red	F green	Right and left thighs.
I	RL green	N black	Right and left thighs.
J	RA white	R red	Right and left deltoids.

Standard 15 Lead Placement

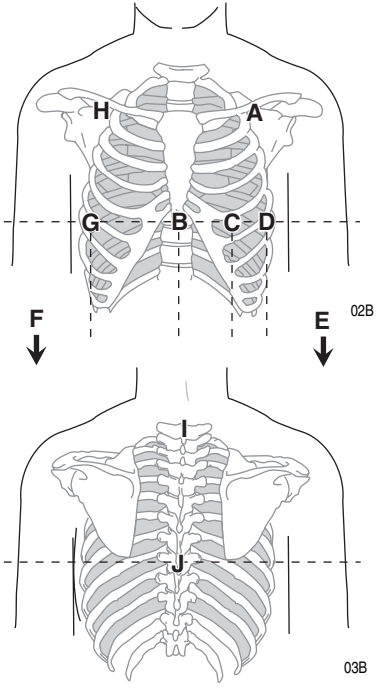


	AHA Label	IEC Label	Electrode Placement
A	V1 red	C1 red	Fourth intercostal space at the right sternal border.
B	V2 yellow	C2 yellow	Fourth intercostal space at the left sternal border.
C	V3 green	C3 green	Midway between location B and D.
D	V4 blue	C4 brown	Mid-clavicular line in the fifth intercostal space.
E	V5 orange	C5 black	Anterior axillary line on the same horizontal level as D.
F	V6 purple	C6 purple	Mid-axillary line on the same horizontal level as D and E.
G	LA black	L yellow	Right and left deltoids.
H	LL red	F green	Right and left thighs.
I	RL green	N black	Right and left thighs.
J	RA white	R red	Right and left deltoids.
K	V4R gray	C4R gray	Right anterior chest opposite of D.
L	V8 gray	C8 gray	Under midscapular line.
M	V9 gray	C9 gray	Left paraspinal border.

Preparing the Patient: Apply the Electrodes

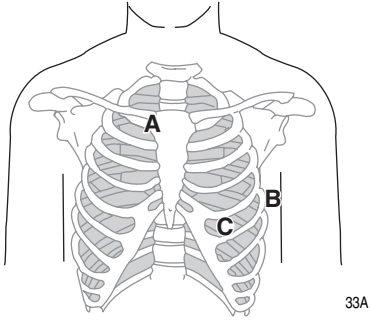
✓ To acquire a NEHB ECG, use the Standard 12 Lead electrode placement and items A and B shown below.

Frank X,Y,Z Placement



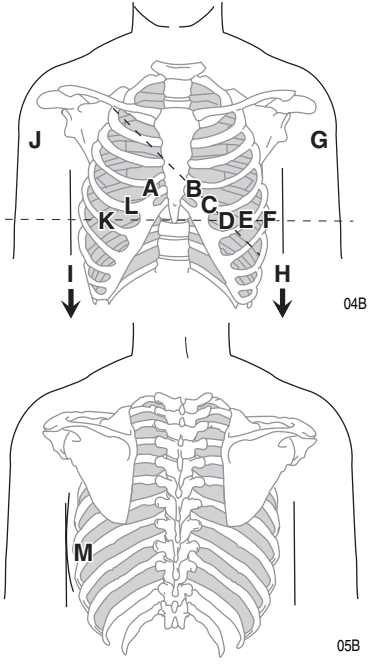
	AHA Label	IEC Label	Electrode Placement
A	LA black	L yellow	Just below the clavicle of the right and left arms.
B	E orange	E light blue	Mid-sternum on the same horizontal level as C and D.
C	V4 blue	C4 brown	Mid-clavicular line in the fifth intercostal space.
D	V6 purple	C6 purple	Mid-axillary line on the same horizontal level as C.
E	LL red	F green	Right and left thighs.
F	RL green	N black	Right and left thighs.
G	I orange	I light blue	Right mid-axillary line on the same horizontal level as C and D.
H	RA white	R red	Just below the clavicle of the right and left arms.
I	H orange	H light blue	Back of neck, avoid the carotid artery and jugular vein.
J	M orange	M light blue	Center of spine on the same horizontal level as C and D.

NEHB Placement



	AHA Label	IEC Label	Electrode Placement
A	A1 orange	N_{st} white	Attachment point of the 2nd rib to the right sternal edge.
B	A2 orange	N_{ax} white	5th intercostal space on the left posterior axillary line. (Same position as V8 or C8.)
C	V4 blue	N_{ap} white	Mid-clavicular line in the fifth intercostal space. (Same position as C4.)

Pediatric Placement

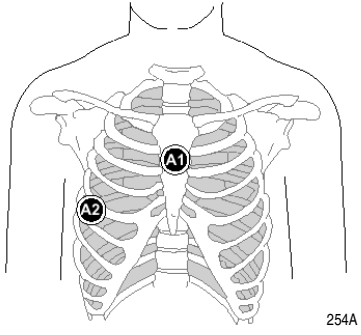


	AHA Label	IEC Label	Electrode Placement
A	V1 red	C1 red	Fourth intercostal space at the right sternal border.
B	V2 yellow	C2 yellow	Fourth intercostal space at the left sternal border.
C	V3 green	C3 green	Midway between location B and D.
D	V4 blue	C4 brown	Mid-clavicular line in the fifth intercostal space.
E	V5 orange	C5 black	Anterior axillary line on the same horizontal level as D.
F	V6 purple	C6 purple	Mid-axillary line on the same horizontal level as D and E.
G	LA black	L yellow	Right and left deltoids.
H	LL red	F green	Right and left thighs.
I	RL green	N black	Right and left thighs.
J	RA white	R red	Right and left deltoids.
K	V4R gray	C4R gray	Mid-clavicular line in the fifth right intercostal space.
L	V3R gray	C3R gray	Halfway between A and K.
M	V7 gray	C7 gray	Same horizontal level of D in the posterior axillary line.

Exercise Electrodes (with Exercise–Option)

In addition to the standard electrodes, apply one electrode on the sternum (A1) and one in location V5R/C5R (A2).

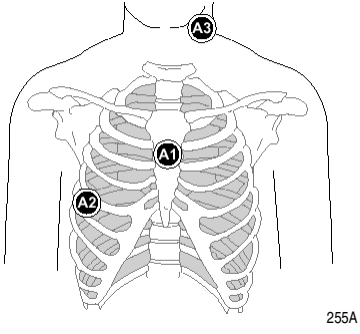
CM5, CC5, ML Lead Placement



Electrode	Electrode Placement
A1	Mid-sternum at the second intercostal space.
A2	In the fifth intercostal space in the anterior axillary line (V5R/C5R).

In addition to the standard electrodes, apply one electrode on the sternum (A1), one in location V5R/C5R (A2), and one on the neck (A3).

CM5, CC5, CH Lead Placement



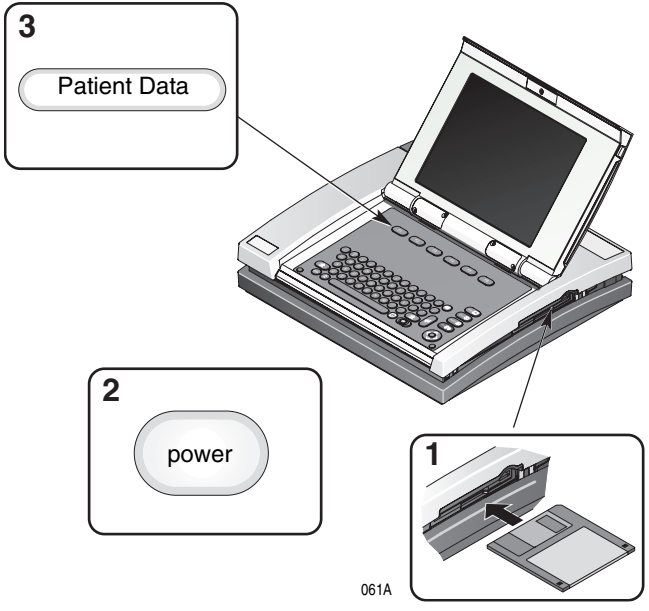
Electrode	Electrode Placement
A1	Mid-sternum at the second intercostal space.
A2	In the fifth intercostal space in the anterior axillary line (V5R/C5R).
A3	On either side of the neck or anywhere above the shoulders.

4 Entering Patient Information

For your notes

Enter Patient Information

Preparation



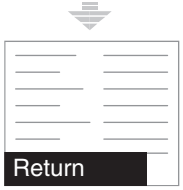
Enter the Information

Select **F1** (*Patient Data*) for each new patient.

CAUTION

Make sure that you enter patient data for the correct patient. Patient data may be retained from a previous patient. Be sure to check the patient info screen for each new patient. Data assigned to the wrong patient causes erroneous patient data that can affect diagnosis and treatment of the patient(s).

Enter the patient data

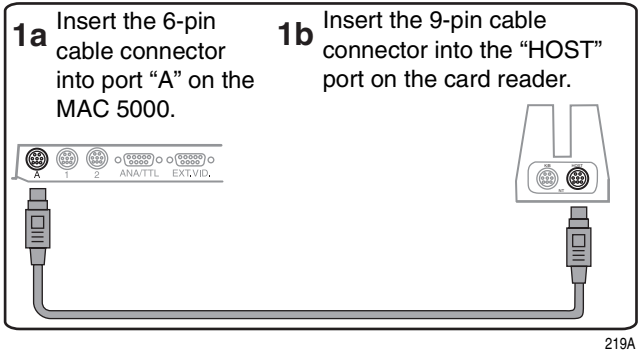


006A, 017A

✓ Our equipment contains several fields which can be filled in before performing an ECG. Some of these fields must be filled in before performing an exam, some are optional and therefore left to the user to assess whether they are needed to perform the exam. A field *RACE* is one of these optional fields. It has been acknowledged by the medical profession as useful to analyze some pathologies. You should be aware that, in some jurisdictions, the processing of data revealing an individual's racial origin is subject to legal requirements, such as obtaining the patient's prior consent. If you elect to collect this type of data, it is your responsibility to ensure that you comply with all applicable legal requirements.

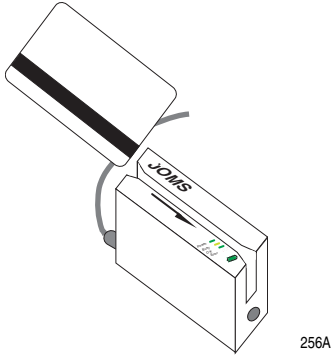
Using a Patient Card Reader (Option)

Connect the Card Reader



Slide Card

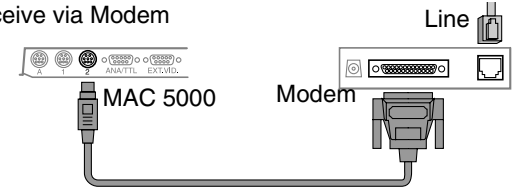
Slide the patient data card through the optional card reader when you are prompted.



Receive Orders From a MUSE CV System (Option)

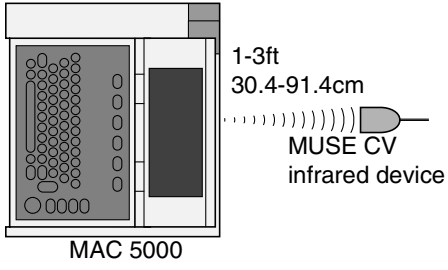
Preparation

1a Receive via Modem



264A

1b Receive via Infrared

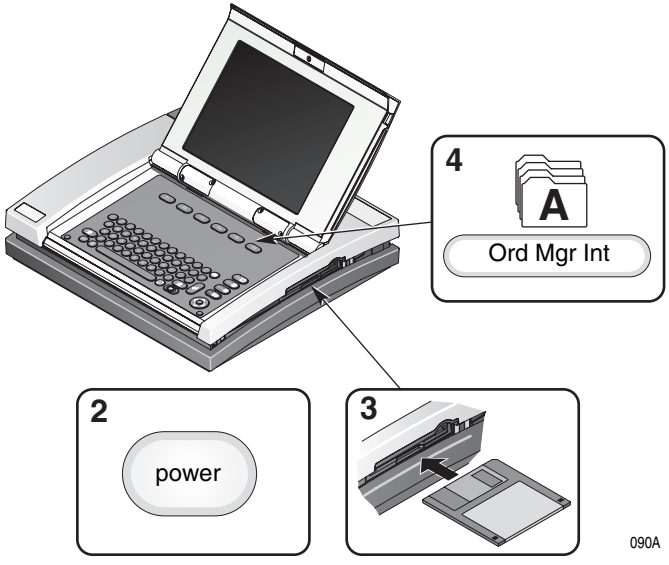


265A

1c Receive via Wireless

263A

✓ Performance of the MobileLink wireless system may vary due to changes in RF (radio frequency) properties of your site or environmental conditions. If you are experiencing intermittent connectivity in certain areas of your facility, it may be necessary to re-initiate the process of receiving from the MUSE system. You may also wish to consult your hospital IT department or your local GE Medical Systems *Information Technologies* networking professional regarding modification of your wireless LAN to improve system performance.



Load the Orders

Load Orders

Choose to delete the old orders or approve the new orders.

Enter the location(s) from which the device should retrieve the orders.

005A, 006A

Select the Orcers to Receive

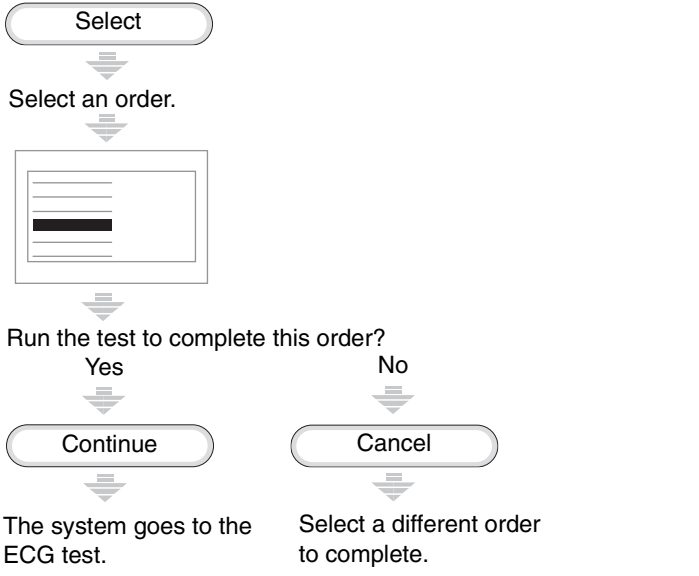
Select one or more orders.

Return

The system stores the orders.

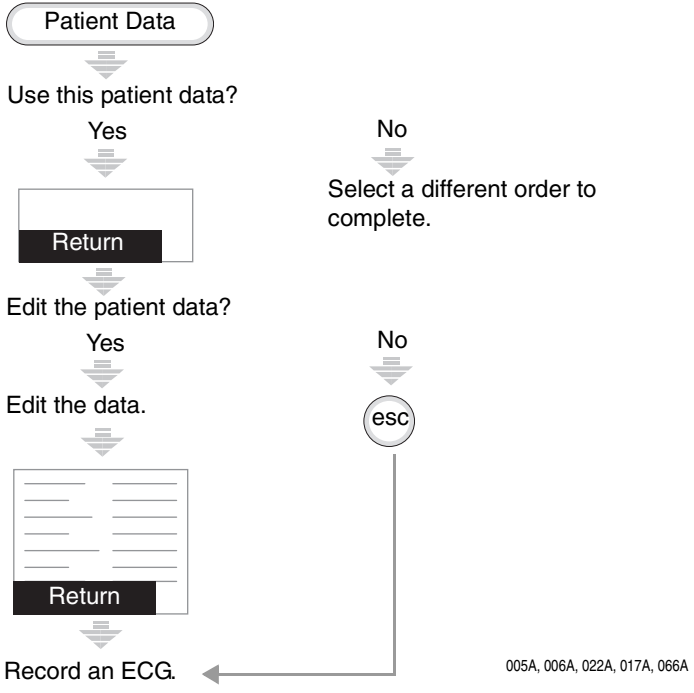
019A, 006A, 005A

Select an Order to Complete



005A, 006A, 020A

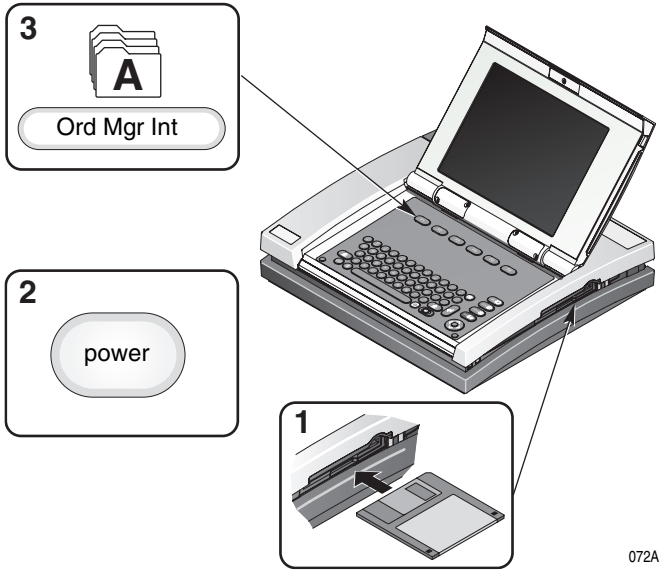
Complete the Order



005A, 006A, 022A, 017A, 066A

Enter Orders Manually (Option)

Preparation

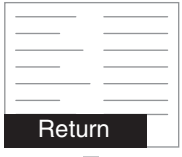


072A

Create an Order

Create Order

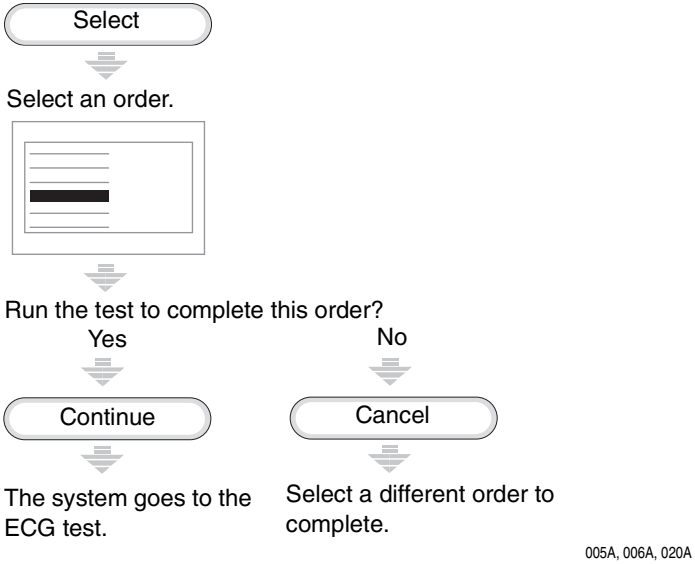
Enter the patient data.



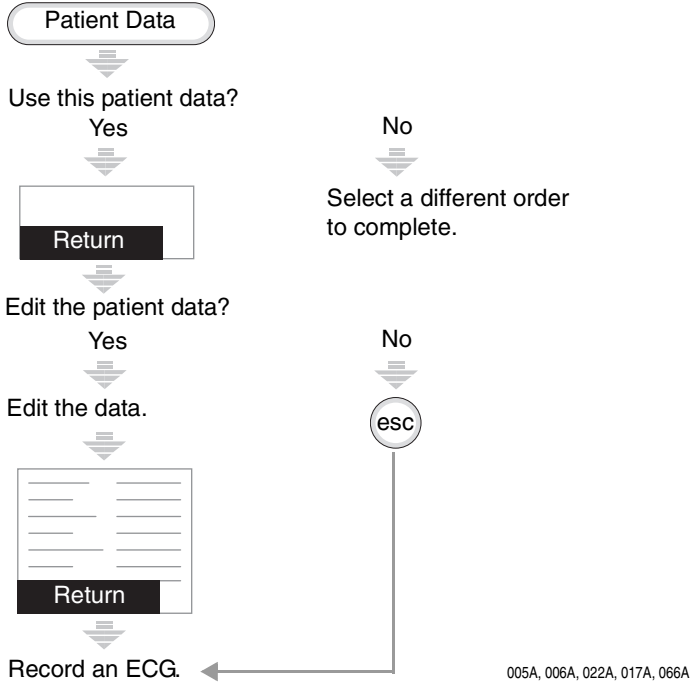
The system stores the order.

005A, 006A, 017A

Select an Order to Complete



Complete the Order

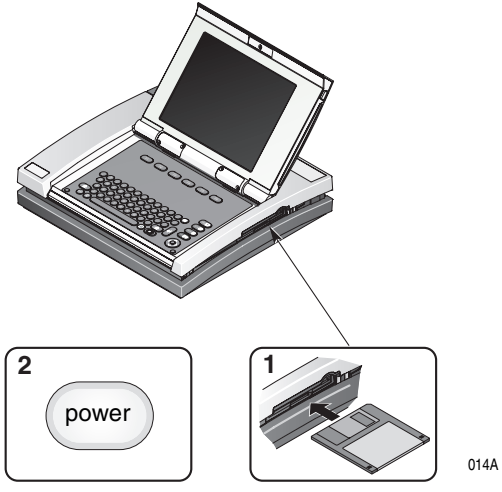


5 Recording an ECG

For your notes

Record a 15 Lead, Resting, Pediatric, or Vector Loops ECG

Preparation



014A

✓ See “Enable or Disable the ACI-TIPI Option” on page 14-8 to enable or disable ACI-TIPI.

Record the ECG

ECG

006A, 013A

To Print Another Report

Copy

006A, 008A

To Store the ECG

Did the *Saving file to Disk* message appear?

Yes

The ECG is stored.

No

Store

005A, 006A

To Transmit the ECG

Did the *Establishing network connection* message appear?

Yes

The ECG is transmitted.

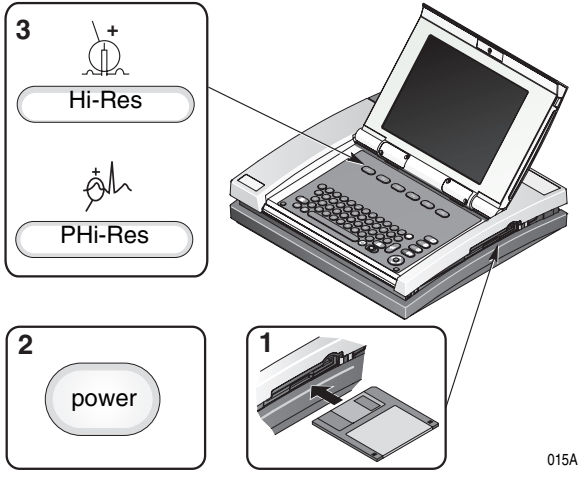
No

See Chapter 9, “Transmitting an ECG” to transmit.

006A

Record a Signal Averaged ECG (Options)

Preparation



✓ To record a PHi-Res ECG, GE Medical Systems *Information Technologies* recommends a target noise level of 0.3MV or less.

Record the ECG

Template

005A, 006A

To Change the Seed Beat

Display

SelectQRS

Select a new seed beat.

005A, 006A

To Average the ECG Data

Average

005A, 006A

To Store the ECG

Store

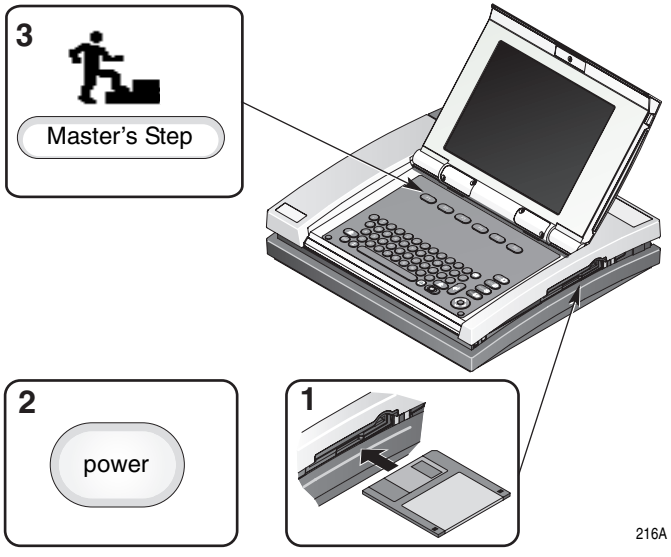
005A, 006A

To Transmit the ECG

See Chapter 9, “Transmitting an ECG” to transmit.

Record a Master's Step Test (Option)

Preparation



Enter Patient Data

Enter the patient's gender, age, and weight either manually with the keyboard or by sliding the patient data card through the card reader option.

Confirm Test Steps

In the *Setup* menu, confirm that the following parameters as correct: *Number of Steps, Test Type, Post J (ms), Step Counter Display, Continuous Recording,* and *Post Exercise ECG Time*. Press *Return*.

Record the ECG

Press the **ECG** button to record a pre-exercise ECG.

Run the Test

1. Remove the leadwires from the patient. Keep the electrodes on the patient.
2. Press *Continue* to begin the exercise test.
3. When the patient finishes the exercise, immediately reattach the leadwires to the electrodes. Check the waveform quality on the screen to confirm that all leadwires are correctly reattached.
4. The MAC 5000 automatically records any additional ECGs you program.
5. Once you record all ECGs, a final report prints.

To Store the Test

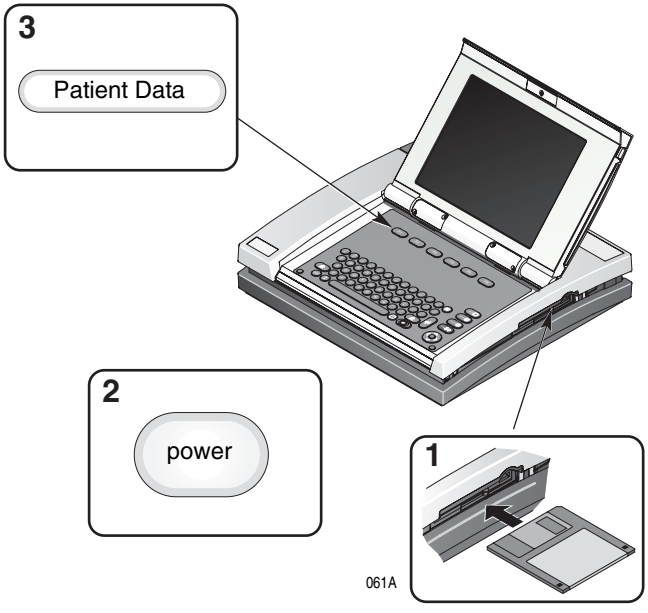
005A, 006A

To Transmit the ECG

See Chapter 9, "Transmitting an ECG" to transmit.

Using ACI-TIPI (Option)

Preparation



Enter the Information

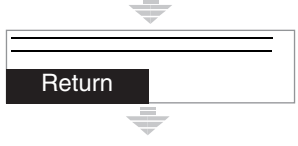
Enter the patient data.

006A, 017A

Press the **ECG** button.

013A

Enter the ACI-TIPI data.



006A, 036A

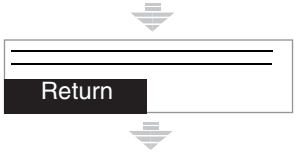
See the beginning of this chapter to print, store, or transmit the ECG.

Enter the ACI-TIPI data.

- *Age* (*18-40, 41-50, >50*),
- *Gender* (*Male/Female*), and
- *Chest or Left Arm Pain* (*Chief Complaint, Secondary Complaint, Not Present*).

  This question asks if the patient's symptom is due to chest pain, pressure or discomfort, arm pain, jaw pain or equivalent discomfort, or epigastric discomfort that suggests acute cardiac ischemia.

  - *Chief Complaint*: Select this option if the complaint of chest or left arm pain is the primary reason the patient came to the hospital.
  - *Secondary Complaint*: Select this option if the complaint of chest or left arm pain is secondary– the patient came to the hospital because of other symptoms.
  - *Not Present*: Select this option if the patient has no chest or left arm pain or equivalent discomfort.



006A, 036A

See the beginning of this chapter to print, store, or transmit the ECG.

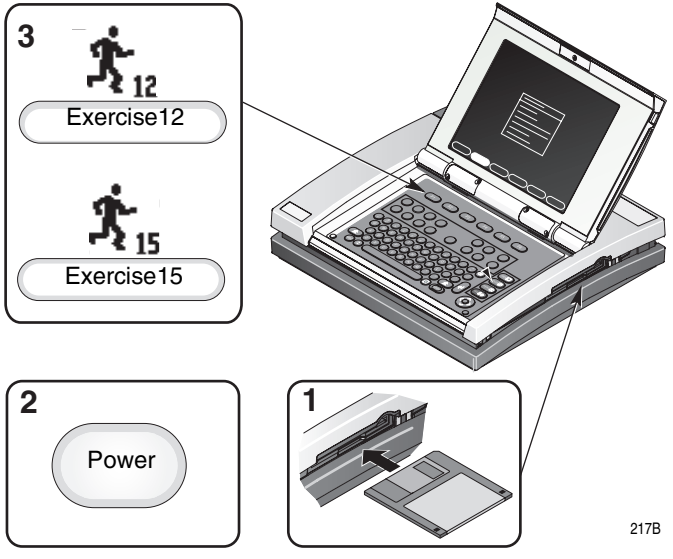
✓ You must have a report "with interpretation" selected in *System setup* in order to obtain an ACI-TIPI report.

✓ To enable ACI-TIPI, see Chapter 14 page 18.

6 Exercise Stress Test (Option)

For your notes

Start an Exercise Stress Test



Patient Data

Patient Data

Enter patient data.

Prep the patient,
attach the leadwires

SelectProtocol

Select desired protocol.

005A, 006A

✓ You may store data during an exercise test to diskette (see Chapter 14, Final Report, Storage Setup). The data is stored to the protocol diskette. Make sure there is sufficient free space on the diskette before starting the test.

Legal Notice

Our equipment contains several fields which can be filled in before performing an ECG. Some of these fields must be filled in before performing an exam, some are optional and therefore left to the user to assess whether they are needed to perform the exam. A field *RACE* is one of these optional fields. It has been acknowledged by the medical profession as useful to analyze some pathologies. You should be aware that, in some jurisdictions, the processing of data revealing an individual's racial origin is subject to legal requirements, such as obtaining the patient's prior consent. If you elect to collect this type of data, it is your responsibility to ensure that you comply with all applicable legal requirements.

Exercise Test Keys

The Exercise Test Keys perform the functions listed in the table.

Key	Function
Pretest	Press to advance to the pretest phase.
Exercise	Press to advance to the exercise phase.
Recovery	Press to advance to the recovery phase.
Test end	Press and hold to end the test and start the test end phase.
Speed W + **Speed W –**	Press to increase or decrease the belt speed or ergometer load.
Grade	Press to change the elevation of the treadmill belt.
Start tmill	Press to start the treadmill during the test.
STOP tmill	Press stop the treadmill during the test.
Recall	Press to print a 10-second delayed recall report.
12 ld	Press to print a 12 lead report.
Medians	Press to print a medians report.
Comment	Press to enter comments that will be stored with the record and printed on some of the final reports.
Enter BP	Press to enter BP readings or to trigger a reading from an external device.

Test Phases

Pretest Phase

Overview

The pretest phase consists of stages configured in each protocol. Commonly used stages are:

- Supine
- Standing
- Hyperventilating

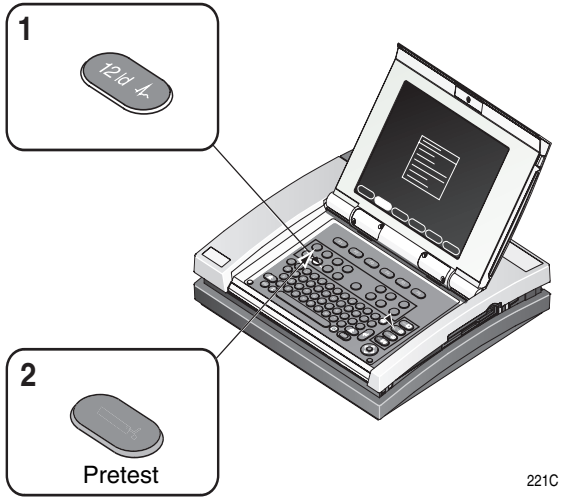
You can configure the *Protocol Editor* to take blood-pressure measurements manually or automatically. (See Chapter 7, "Edit Protocols Options").

The system will beep and display a message prompt in the header of the display.

A set of medians is saved at the end of the **Pretest** phase as baseline medians.

Operating Steps

1. Press the **12 ld** to acquire and print a baseline ECG.



2. Press **Pretest** to advance to the next *PRE-TEST* stage.
3. If you are using a treadmill to conduct the exercise test, tell the patient to place his/her feet on the treadmill frame, not on the belt.

WARNINGS

Wait until treadmill belt is moving before placing feet on belt.

Pinch point hazard. Keep hands, hair, jewelry, and loose clothing away from moving parts. Otherwise, serious injury could result.

4. Press **Start tmill** (on the treadmill controller keyboard) to start the treadmill belt moving.

During the exercise test, you can:

- Press **STOP tmill** once (on the treadmill controller keyboard) to stop the treadmill GRADUALLY.
- Press and hold **STOP tmill** (on the treadmill controller keyboard) to stop the treadmill belt QUICKLY.
- Press the emergency stop button (usually mounted on the treadmill) to stop the treadmill QUICKLY.
- Press **Speed W +** or **Speed W –** and **Grade** keys (on the treadmill controller keyboard) to manually control the test. However, once you press these keys, you control the speed and grade during the remainder of the *EXERCISE* and *RECOVERY* phases, not the protocol.

Pretest Phase Buttons

Menu	Function
Patient Data	Enter a patient's name, ID number, etc. Enter the patient's age to allow your system to calculate the maximum and target heart rates.
New Protocol	Select a different exercise test protocol. ✓ This function is only available if NOT storing data to a diskette.
Measurements	Will allow the system to reestablish the median complex, set the J point, then select the three leads used to calculate heart rate.
Leads	Select the leads used for 3 or 6 *Rhythm* leads, *All Leads, Lead Check,* or *Lead Placement*.
Median	Select a lead to act as the median lead. This can be a fixed lead or scanned for lead with most ST depression.
Writer	Change the writer's arrhythmia documentation (doc.), cubic spline (baseline control), paper speed, gain, filter, and writer on/off settings.

Exercise Phase

Overview

The selected protocol controls the treadmill or ergometer. When you enter the exercise phase:

- The belt speed and grade or the ergometer workload change according to the selected protocol,
- The exercise clock (top) starts, and
- The system starts to save the test data.

Operating Steps

WARNING

Fall Hazard: Your patient should wait until the treadmill belt is moving before stepping onto the belt. Severe injury can result from a fall. For the same reason, avoid rapid changes in belt speed.

1. Press the **Exercise** button to begin the exercise phase.
   - ◆ During the test you can manually perform operations from the function keyboard.
2. Press the **Start tmill** button if treadmill or ergometer has not been started yet.

   If you are using an ergometer, the ergometer workload is automatically controlled.

   The exercise test advances through the exercise stages automatically unless the operator manually overrides the test.

✓ When the stages in the treadmill protocol have durations other than infinite, the exercise test advances from stage to stage automatically. However, you can press **Exercise** (on the treadmill controller keyboard) to manually advance to the next *EXERCISE* stage.

3. You can manually change a treadmill's speed and grade however this puts you in the manual mode throughout the test.

- Press **Speed W +** ↑ (to increase speed) within 5 seconds of your last workload change.
- Press **Speed W –** ↓ (to decrease speed) within 5 seconds of your last workload change.
- Press **Grade** ↑ (to increase grade) within 5 seconds of your last workload change.
- Press **Grade** ↓ (to decrease grade) within 5 seconds of your last workload change.

Exercise Phase Buttons

Menu	Function
Event	Press to display a list of predefined events.
Stage Hold	In exercise phase, press to hold current stage.
Measurements	Will allow the system to reestablish the median complex, set the J point, then select the three leads used to calculate heart rate.
Leads	Select the leads used for 3 or 6 *Rhythm* leads*, All Leads, Lead Check,* or *Lead Placement*.
Median	Select a lead to act as the median lead. This can be a fixed lead or scanned for lead with most ST depression.
Writer	Change the writer's arrhythmia documentation (doc.), cubic spline (baseline control), paper speed, gain, filter, and writer on/off settings.

Recovery Phase

Overview

In recovery, the treadmill speed and grade or the ergometer load changes based on the protocol configuration.

Operating Steps

1. Press the **Recovery** button to advance to the recovery phase.
   - The clock begins timing the recovery phase.

Recovery Phase Buttons

Menu	Function
Event	Press to display a list of predefined events.
Edit	Press during **Recovery** or **Test end** will allow user to enter or edit patient data, reason for test termination, or comments.
Measurements	Will allow the system to reestablish the median complex, set the J point, then select the three leads used to calculate heart rate.
Leads	Select the leads used for *Rhythm Lead 1, 2,* and *3, All Leads, Lead Check,* or *Lead Placement*.
Median	Select a lead to act as the median lead. This can be a fixed lead scanned for lead with most ST depression.
Writer	Change the writer's arrhythmia documentation (doc.), cubic spline (baseline control), paper speed, gain, filter, and writer on/off settings.

Test End Phase

Overview

After you press the and hold **Test end** button, the following happens:

- The system no longer acquires and stores ECG measurement data,
- The clocks stop, and
- Workload/speed/grade no longer display.

✓ The button for **Test end** MUST be held for more than one second to activate. This is done to prevent the test from being stopped by an accidental key press.

Operating Steps

1. Press and hold the **Test end** button to end the test and start the test end phase.
2. Select *Reason for termination* or *Comments* to enter information about this exercise test.
3. Select *Continue* to return to the *TEST-END* menu.
   - A final report prints automatically if you selected this option in the *Edit Protocol* function (Select *Main Menu* → *Edit Protocol* → *TEST-END* phase screen → *Report column* → *Style column* → *Final*.)
   - To change the type of reports that are printed automatically, see "Final Report" in chapter 14.
4. To edit *Patient Data*, *Reason for termination*, or *Comments*, select *Edit*. You can edit this information until you select *New Patient* or *Main Menu*.
   - Select *Reports* to print a report containing the revised information.

✓ You can store the final exercise report to a diskette.

You must define the type of final report you want stored to your system. (Select *System Setup*, *Exercise Report*, then *Final Report*.

Test End Phase Buttons

Menu	Function
Edit	Press during **Recovery** or **Test end** to edit patient data, enter reasons for termination of test, or comments regarding test.
Reports	Press during **Test end** to select a final report to print.
Leads	Select the leads used for *Rhythm Lead 1, 2,* and *3, All Leads, Lead Check,* or *Lead Placement*.
Median	Select a lead to act as the median lead. This can be a fixed lead scanned for lead with most ST depression.
Writer	Change the writer's arrhythmia documentation (doc.), cubic spline (baseline control), paper speed, gain, filter, and writer on/off settings.
More	Select to see *More* menu options.
Main Menu	Return to the system *Main Menu*.
New Patient	Remain in the exercise application and start a test for a new patient.

For your notes

7 Edit Protocols Options

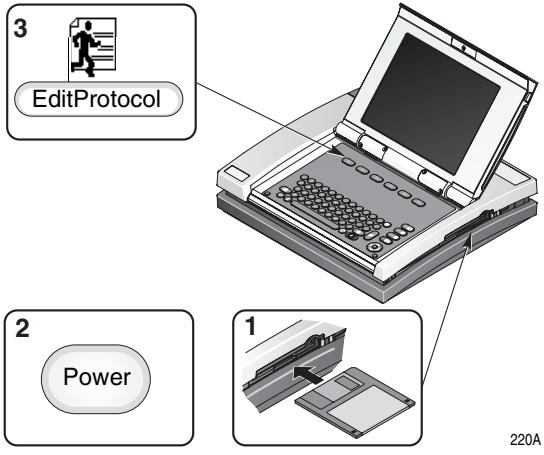
For your notes

Overview

You can edit an existing ergometer or treadmill protocol or, you can create a new protocol. These protocols are used to run an exercise test.

Follow these steps to edit an existing protocol or create a new protocol:

Operating Steps



✓ If using a blank diskette or one without stored protocols, default protocols will be written to the diskette.

1. Select a protocol to edit, or select ‹‹ *spare* ›› if you want to create a new protocol.

The following table describes the items you can change on the screen.

Variable Protocols

Menu Item	Description
Protocol name	Displays the name of the protocol you are editing. You may type a different name to begin creating a new protocol.
Menu name	Type the name of this protocol as you would like it to appear on your screen menu.
Exercise Test Type	Select *Treadmill in MPH or Km/h, Analog Treadmill in MPH or Km/h, Ergometer in Watts or KPM*. This is the type of exercise test you want to perform. ✓ Select *Treadmill* if using with a T2000 treadmill.
Ramp Protocol	Select *Yes* if you want the ergometer workload (or treadmill speed and grade) to change every 6 seconds. Select *No* if you want the ergometer workload (or treadmill speed and grade) to change every stage.
Name of PRETEST phase	Type the name of your *PRE-TEST* phase as you would like it to appear on your reports.
Name of EXERCISE phase	Type the name of your *EXERCISE* phase as you would like it to appear on your reports.
Name of RECOVERY phase	Type the name of your *RECOVERY* phase as you would like it to appear on your reports.
Name of FINAL phase	Type the name of your *FINAL* (*TEST-END*) phase as you would like it to appear on your reports.
Peak report style	Choose one of the following reports to print a time of peak exercise (during transition to *RECOVERY* phase from *EXERCISE* phase): *No report, 12/15 Ld, Medians,* and *5 second Rhythm*.

2. Select *Return* when you are finished changing the *Protocol name, Menu name,* etc. The first phase screen (usually called *PRE-TEST*) appears. The table below explains each column of the *PRE-TEST* phase screen.

Pre-Test Phase Screen

Column	What Does This Column Allow You to Do?
Stage	Create multiple stages for each phase, except *TEST-END* where only one stage is allowed.
Duration	Set the duration of each stage. You may choose from 00:00-99:59 (minutes and seconds), or infinite duration. The last stage always has an infinite duration. This means that your MAC 5000 remains in the last stage for an infinite duration, or until you stop the exercise test.
Ergometer or	Set the ergometer workload in Watts or KPM. ■ Select from 0 to 1000 Watts (5 watt increments.) ■ Select from 0 to 6000 KPM (25 KPM increments.)
Treadmill	Set the treadmill speed in MPH or Km/h: ■ Select from 0.0 to 25.0 MPH (0.1 MPH increments) ■ Select from 0.0 to 40.0 Km/h (0.1 Km/h increments) Set the treadmill grade: ■ Select from 0.0 to 40.0 percent (0.1 percent increments)
Report	Print reports during a stage automatically. ■ Style sets the type of report that prints. You may choose *No Report, 12 Ld, Medians,* or a *5 second Rhythm* report. ■ *First* indicates when the first report prints. ■ *Repeat* indicates the frequency the reports print after the first report prints.
BP	Set blood pressure prompting during a stage. ■ *First* indicates when the first blood pressure prompt occurs. ■ *Repeat* indicates the frequency of blood pressure prompts after the first prompt occurs.
Median	Set how often Median complexes are saved during a stage for the final report. ■ *First* indicates when the first Median is saved. ■ *Repeat* indicates how often Median complexes are saved after the first Median complex is saved.

3. To edit Stage information, use the arrow pad to select the desired stage, then press the *Edit* function key. A box will pop up that will allow the stage information to be edited.

Pre-Test Protocol Information

You want to…	How do you change this item?
Edit stage information.	■ Use the arrow pad to select the stage you want to edit. A pop-up box appears showing the current information for this stage. ■ Edit the information for this stage in the pop-up box. ■ Press return.
Add another stage to the phase.	When you add a stage, it is placed below the highlighted stage. ■ Use the arrow pad to highlight a stage. ■ Press Add to add a stage.
Change the *Duration* of a stage.	■ Use arrow pad to select the *Duration* field. ■ Use the keyboard to enter the new stage duration. ■ Type in the duration time or press delete to set to infinite duration. ■ Press enter.
Change the *Ergometer* workload or *Treadmill* speed and grade during a stage.	■ Use the arrow pad to select the ergometer work load, treadmill speed, or treadmill grade field. ■ Use the keyboard to enter the new value for this stage. ■ Type in the value or press delete to indicate no workload value. ■ Press enter. **WARNING** Avoid rapid changes in treadmill speed and/or grade during a stress test.
Change the *Report Style* printed automatically during a stage.	■ Use the arrow pad to select the *Report Style* field. ■ Use the arrow pad to select the stage *Report Style* you want to change. A pop-up box appears showing the types of reports available. ■ Use the arrow pad to select the report you want to print automatically for this stage. ■ Press enter.
Change the *Report, Median* and *BP First/ Repeat* values for a stage.	■ Use the arrow pad to select the appropriate field. ■ Type in your own time value or press the delete key to indicate no Report, Median, or BP for this stage. ■ Press enter.

Advance to Exercise

1. Advance to the *EXERCISE* phase using one of the following methods:
   - Press **Phase**.
   - Next press **Exercise**.
2. To edit the settings for the *MANUAL* mode of operation, choose the menu option, *STAGES/ MANUAL*, via the function keys to switch from the *STAGES* mode of operation to the *MANUAL* mode.

✓ When you create or edit a ramp protocol, always define at least four interim stages between the first and last stage. This prevents abrupt changes in workload or speed and grade if the stage advances accidentally.

3. Change the *EXERCISE* phase information. See "Pre-Test Protocol Information" on page 7-7 as a sample guide for editing this protocol information.

Advance to Recovery

1. Advance to the *RECOVERY* phase using one of the following methods:
   - Press **Phase**.
   - Next press **Recovery**.
2. Change the *RECOVERY* phase information. See "Pre-Test Protocol Information" on page 7-7 as a sample guide for editing this protocol information.

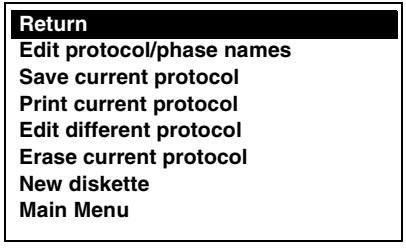
Advance to Test End

Advance to the *TEST-END* phase using one of the following methods:

- Press **Phase**.
- Next press and hold **Test end**.

Change the *TEST-END* phase information. The only parameter that may be edited in *TEST-END* phase is the report type. You may choose: *No report* or *Final*.

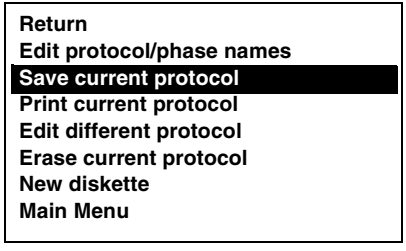
Press *Menu* when you finish editing the phases of the protocol. An *Edit* menu similar to the following appears.



Save Current Protocol

Select *Save current protocol* to save your new or revised protocol.

Press *Menu* again. The *Edit* menu appears.



To add or change another protocol, select *Edit different protocol*.

Select *Main Menu* to display the *Main Menu*.

Select *Exercise* to run an exercise test.

Edit Protocols Options: Save Current Protocol

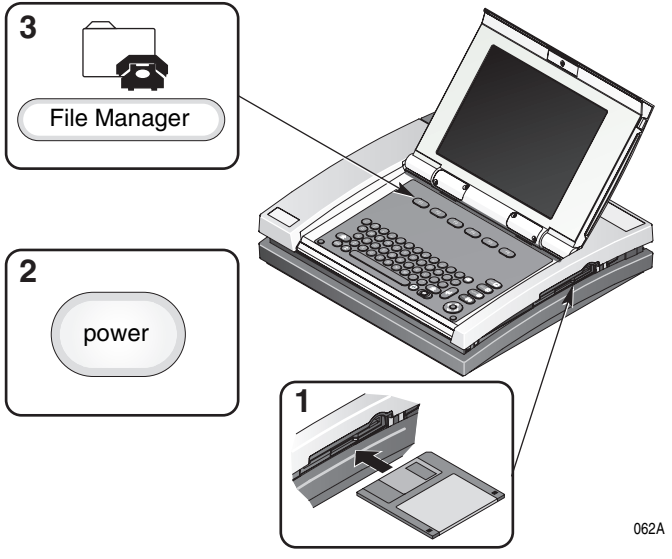
For your notes

8 Printing an ECG Report

For your notes

Print Stored ECG Reports

Preparation



062A

Select the ECGs

Select

Select one or more ECGs.

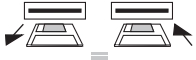
005A, 006A, 019A

Print the ECGs

Print

Print ECGs from a different disk?

Yes



New Disk

No

Main Menu

005A, 006A, 071A

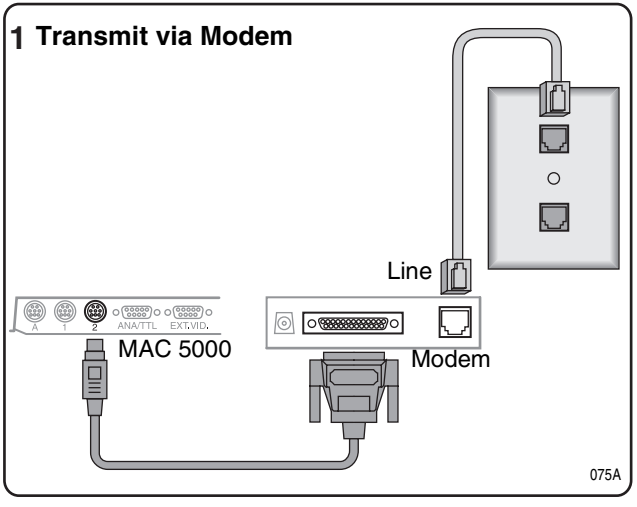
For your notes

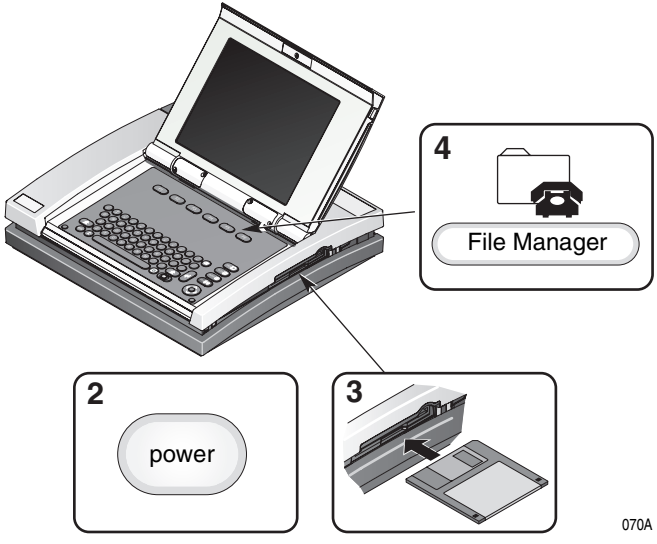
9 Transmitting an ECG

For your notes

Transmit Stored ECGs by Modem (Option)

Preparation





Select the Receiving Device

Transmit to the default receiving device?

Yes

Select and transmit the ECGs as described in the next sections.

No

Location

Type the telephone number of the receiving device.

Select a modem type.

005A, 006A, 035A, 063A, 036A

Select the ECGs

Select

Select one or more ECGs.

005A, 006A, 019A

Transmit the ECGs

Transmit

Transmit ECGs from a different disk?

Yes

New Disk

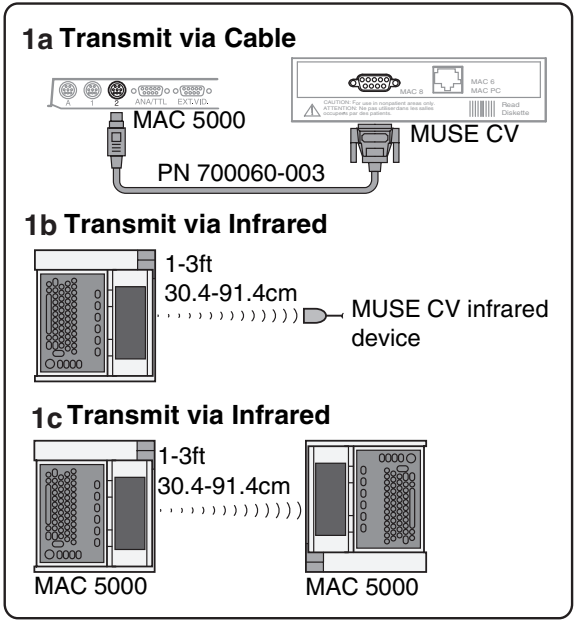
No

Main Menu

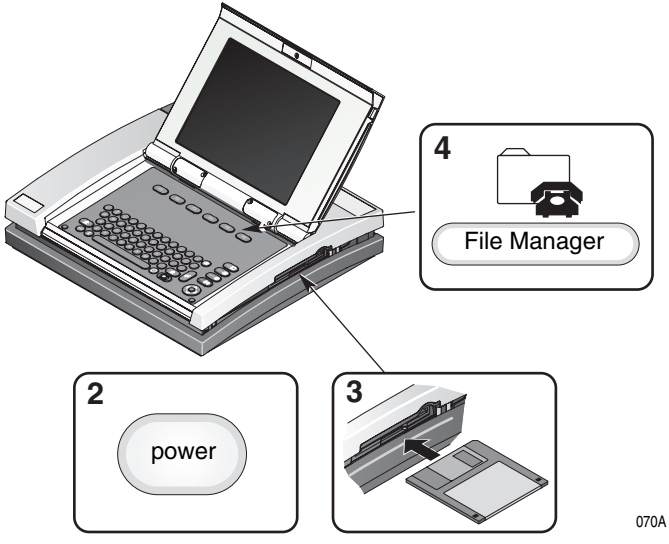
005A, 006A, 071A

Transmit Stored ECGs Locally

Preparation

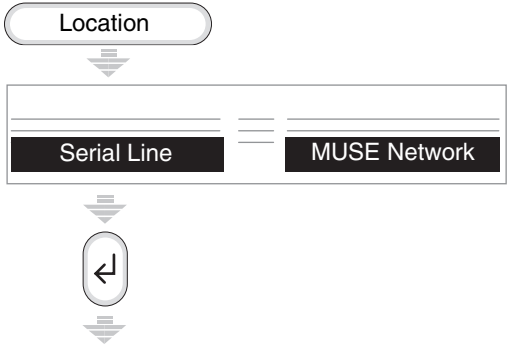


107A



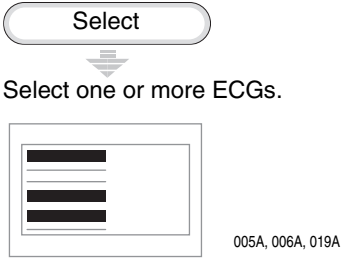
070A

Select the Method of Transmission



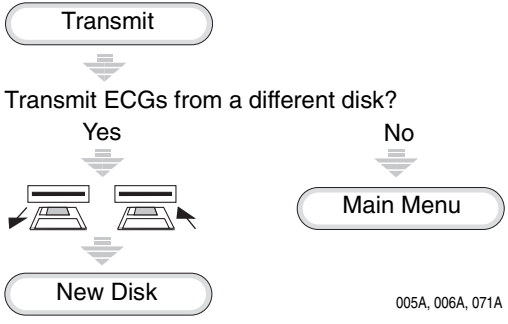
005A, 006A, 068A

Select the ECGs



005A, 006A, 019A

Transmit the ECGs

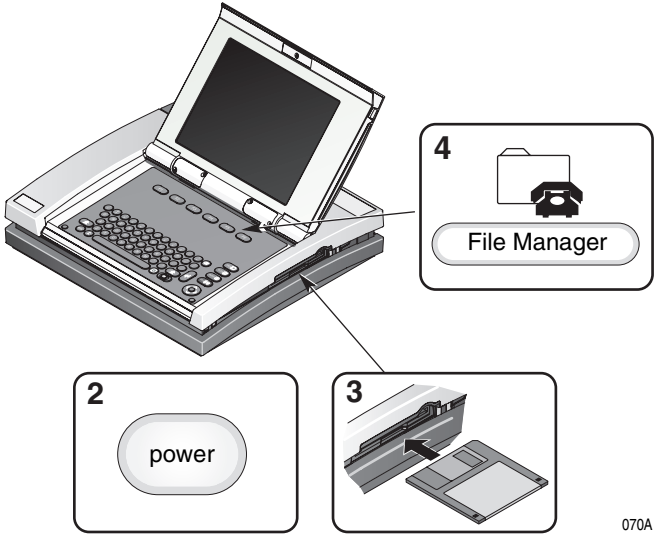


005A, 006A, 071A

Transmit Stored ECGs by Wireless (Option)

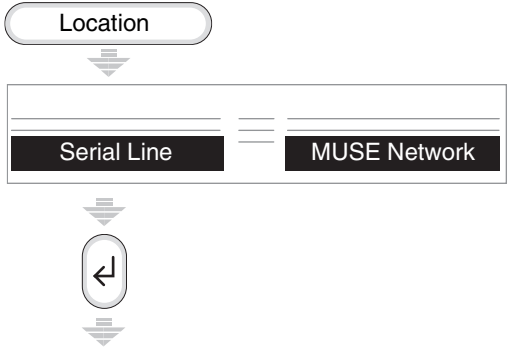
Preparation

263A



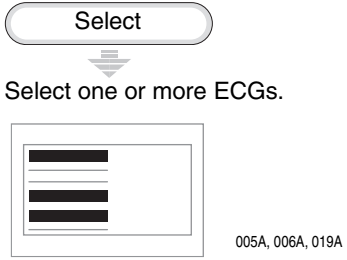
070A

Select the Receiving Device



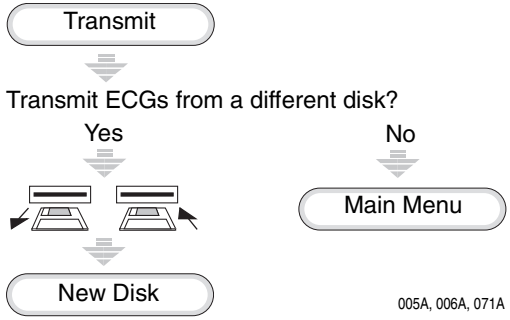
005A, 006A, 068A

Select the ECGs



005A, 006A, 019A

Transmit the ECGs



005A, 006A, 071A

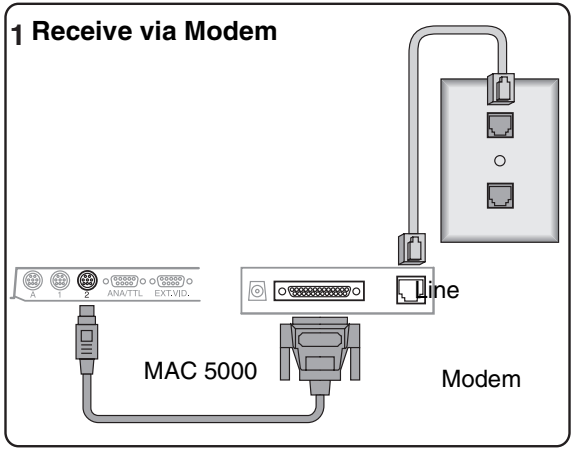
✓ Performance of the MobileLink wireless system may vary due to changes in RF (radio frequency) properties of your site or environmental conditions. If you are experiencing intermittent connectivity in certain areas of your facility, it may be necessary to re-initiate the process of transmitting to the MUSE system. You may also wish to consult your hospital IT department or your local GE Medical Systems *Information Technologies* networking professional regarding modification of your wireless LAN to improve system performance.

10 Receiving an ECG

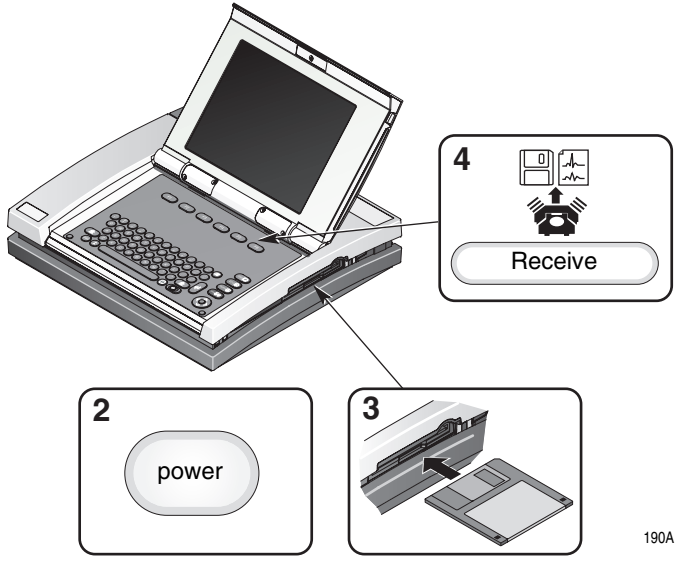
For your notes

Receive ECGs by Modem (Option)

Preparation

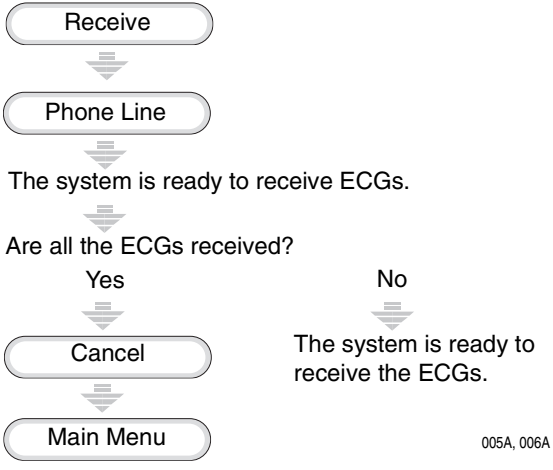


075A



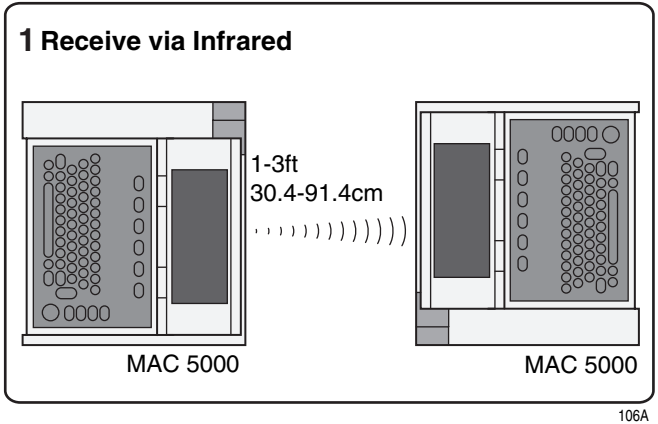
190A

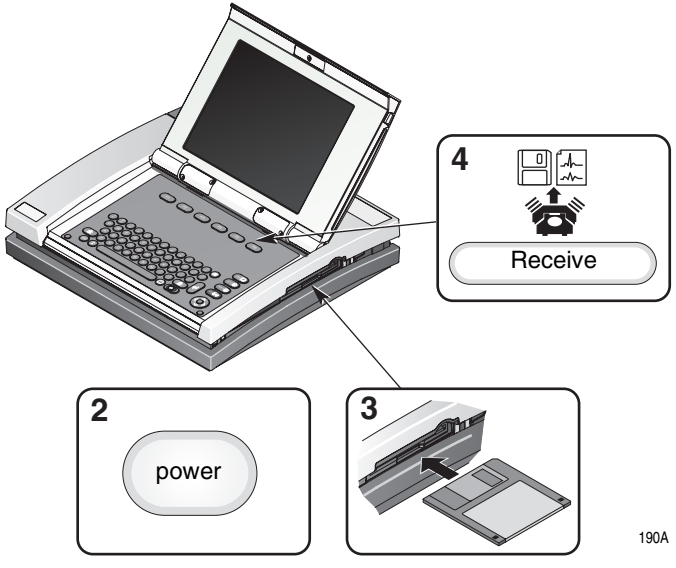
Receive the ECGs



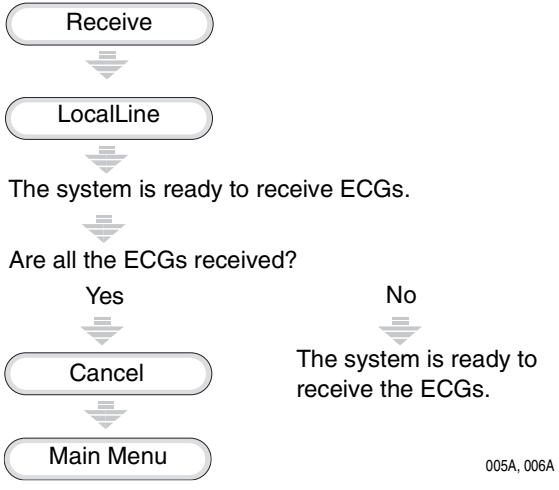
Receive ECGs Locally

Preparation



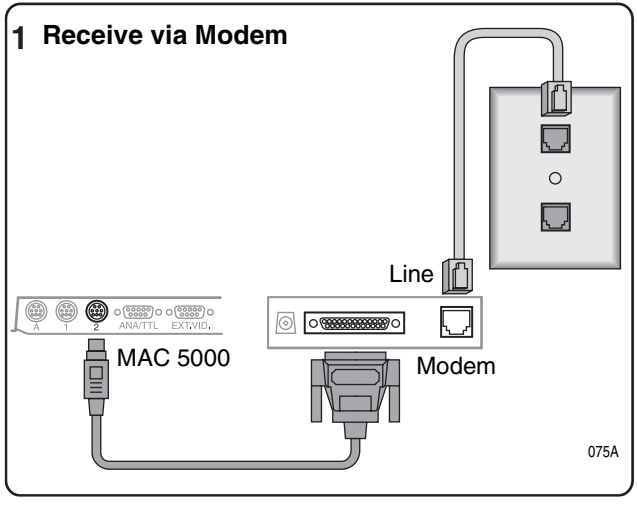


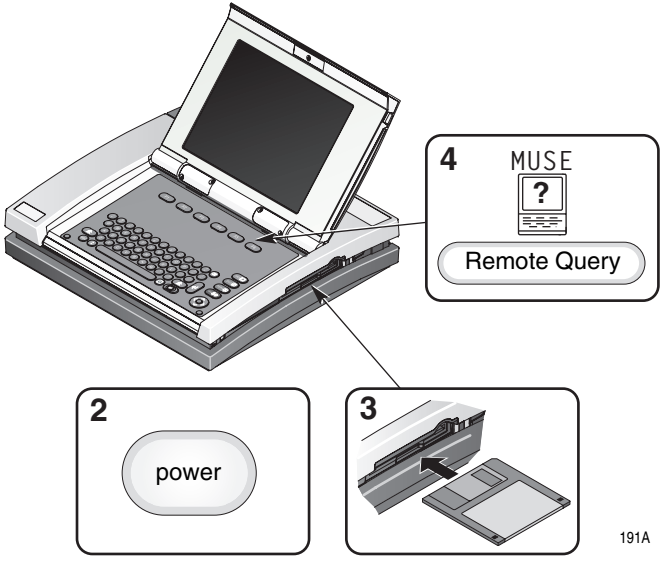
Receive the ECGs



Retrieve Confirmed ECGs from a MUSE CV System via Modem (Option)

Preparation



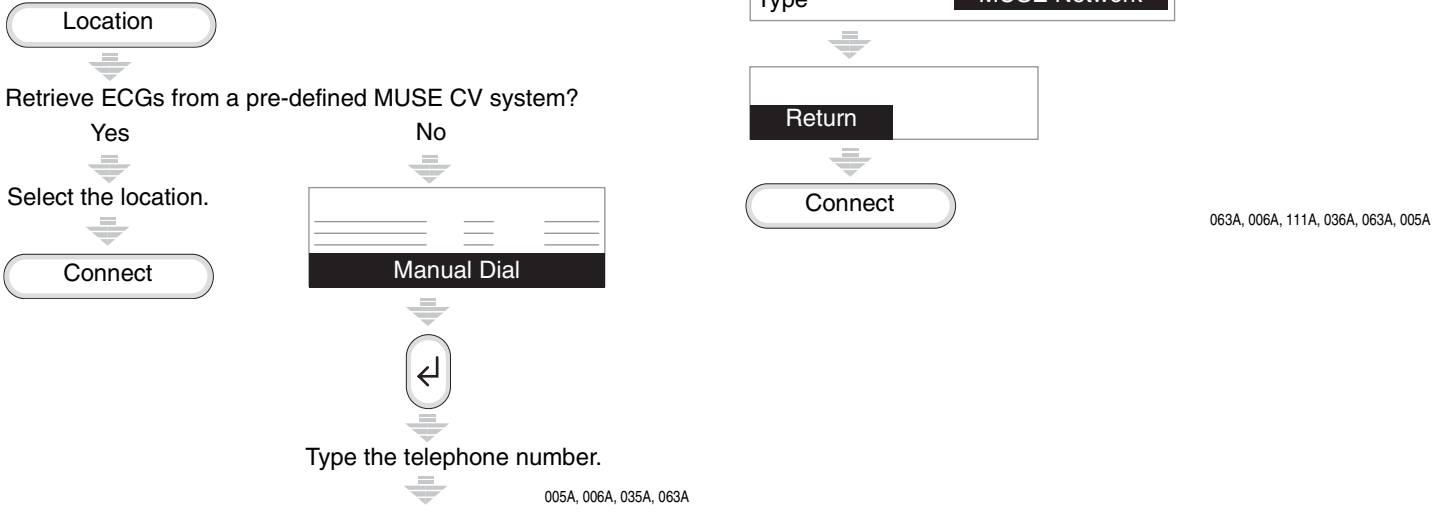


Select a MUSE CV System

To Retrieve ECGs From the Default MUSE CV System

Connect

To Retrieve ECGs from a Different MUSE CV System



Select an ECG

Type the patient's ID number.

The system retrieves a directory of tests.

Select

Select one or more tests.

006A, 036A, 005A, 019A

✓ If you do not know the patient's ID number, type the patient's last name. Then select your patient from the displayed list of patients.

Display or Print the ECG

To Display the ECG

Display

The system retrieves then displays the test.

To Print the ECG

Print

The system retrieves then prints the test.

Display or print another ECG?

Yes

Return

Select an ECG.

No

Disconnect

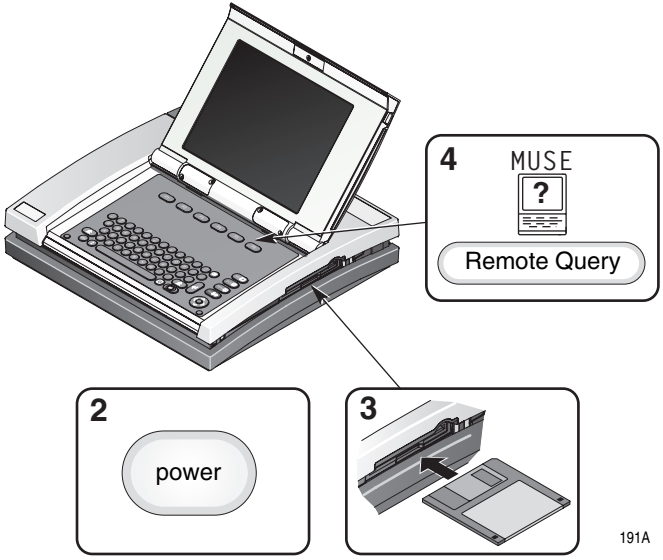
Main Menu

005A, 006A

Retrieve Confirmed ECGs from a MUSE CV System via Wireless (Option)

Preparation

263A



191A

✓ Performance of the MobileLink wireless system may vary due to changes in RF (radio frequency) properties of your site or environmental conditions. If you are experiencing intermittent connectivity in certain areas of your facility, it may be necessary to re-initiate the process of receiving from the MUSE system. You may also wish to consult your hospital IT department or your local GE Medical Systems *Information Technologies* networking professional regarding modification of your wireless LAN to improve system performance.

Select a MUSE CV System

To Retrieve ECGs From the Default MUSE CV System

Connect

To Retrieve ECGs from a Different MUSE CV System

Location

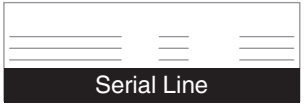
Retrieve ECGs from a pre-defined MUSE CV system?

Yes

Select the location.

Connect

No



↵

Connect

005A, 006A, 035A, 063A

Select an ECG

Type the patient's ID number.

The system retrieves a directory of tests.

Select

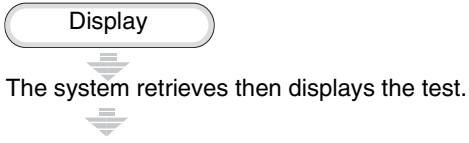
Select one or more tests.

006A, 036A, 005A, 019A

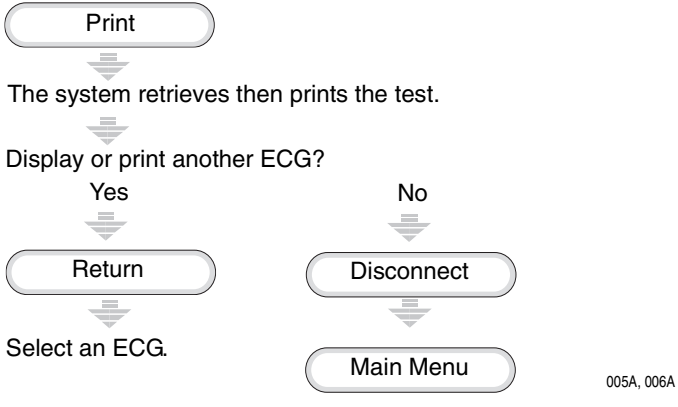
✓ If you do not know the patient's ID number, type the patient's last name. Then select your patient from the displayed list of patients.

Display or Print the ECG

To Display the ECG



To Print the ECG



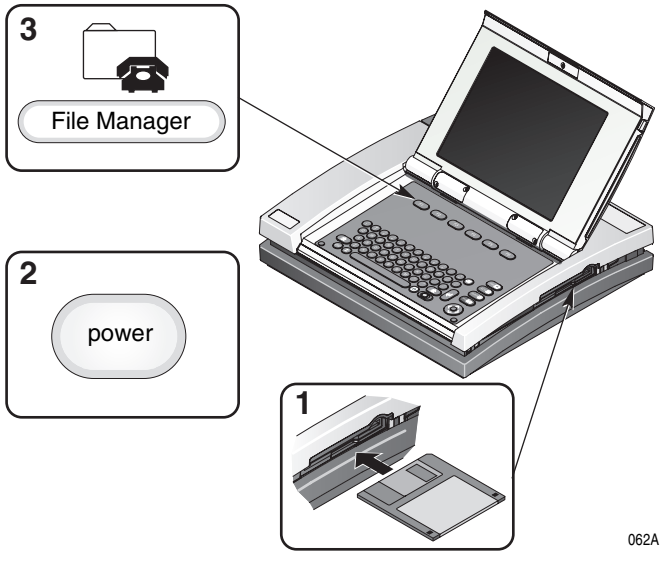
005A, 006A

11 Editing an ECG

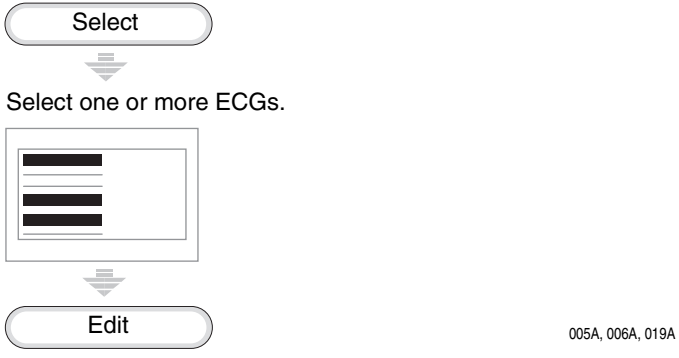
For your notes

Edit Demographic and Interpretive Data

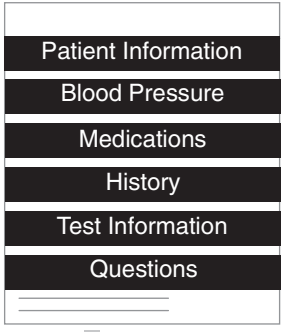
Preparation



Select the ECGs



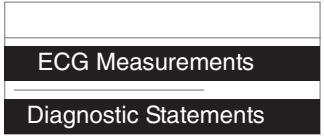
Edit Demographic Data



Edit the data.

189A, 006A, 044A

Edit Interpretive Data



053A

✓ Because editing interpretive data “confirms” the ECG, you must enter a password before editing this data.

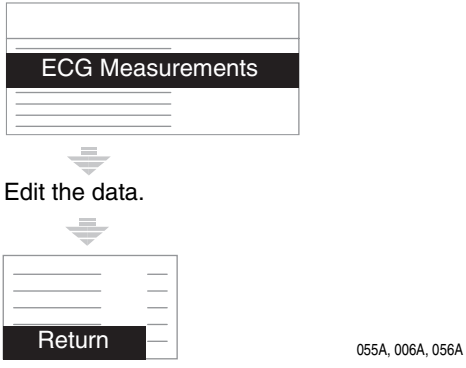
Enter the Overreader Password

Type the overreader password.

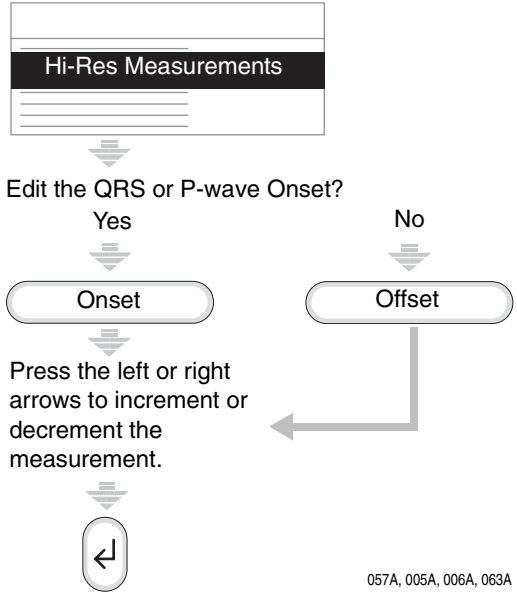
Type the reviewer information.

006A, 063A, 054A

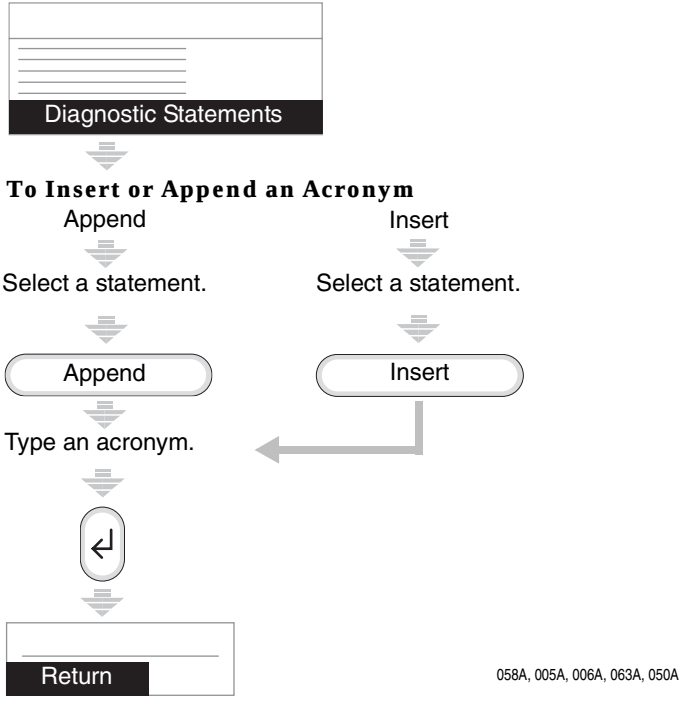
Edit Resting, Pediatric, or Vector Loops Measurements

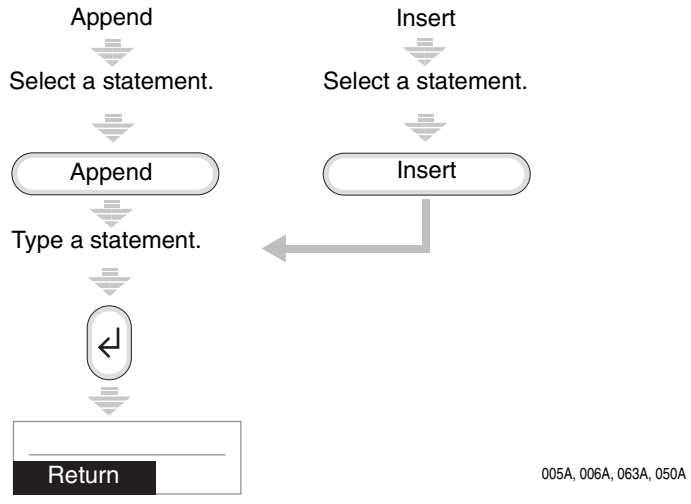


Edit Signal Averaged ECG Measurements



Edit Diagnostic Statements





To Move a Statement to a New Line

Select a statement.

To Delete a Statement

Select a statement.

To Join Two Statements

Select a statement to join with the preceding statement.

Store the Edited ECG

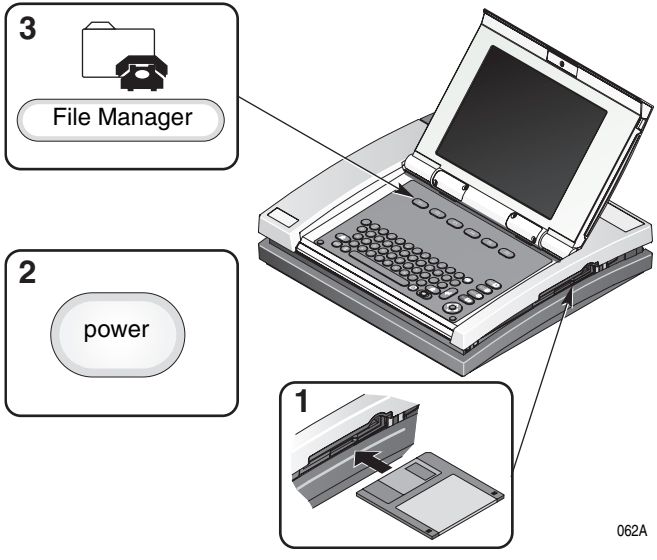
For your notes

12 Deleting an ECG

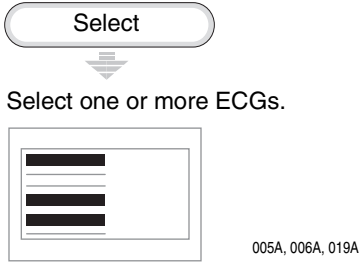
For your notes

Delete Stored ECGs

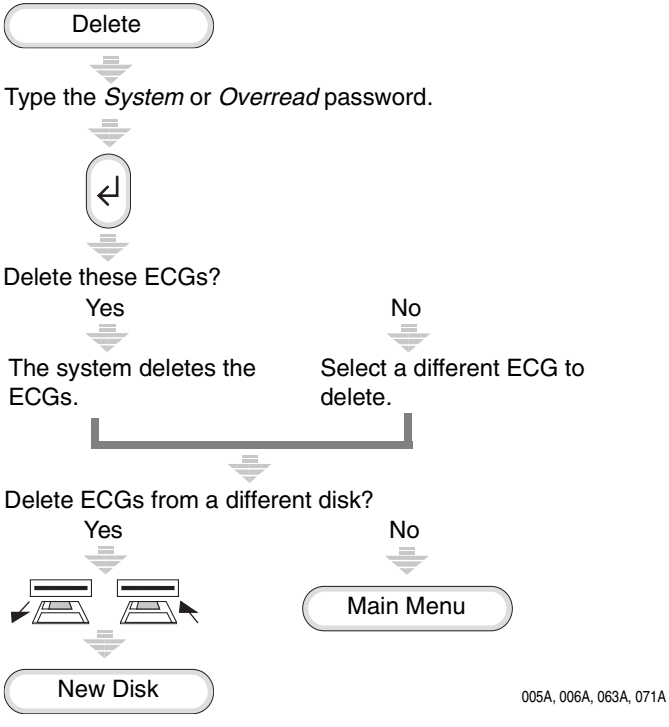
Preparation



Select the ECGs

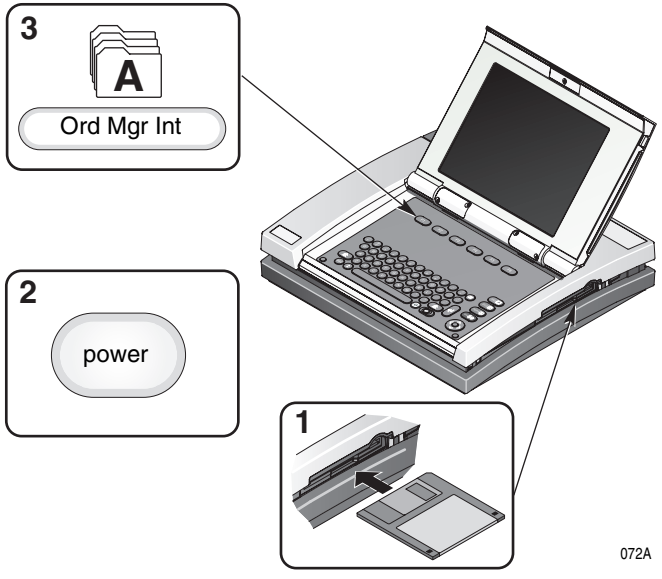


Delete the ECGs



Delete Stored ECG Orders (Option)

Preparation



072A

Select the Orders

Load Orders

Delete

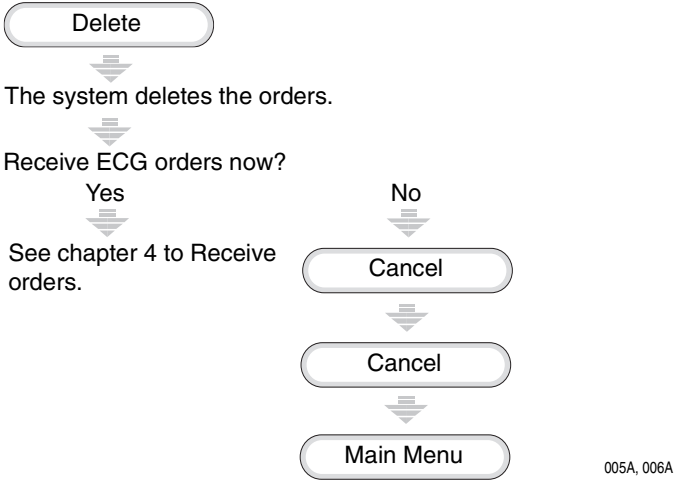
Select an order.

✓ Only orders that have not been completed may be deleted.

Delete

005A, 006A, 019A

Delete the Orders



13 Completing Other Tasks

For your notes

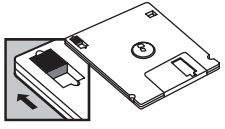
Prepare a Disk for Use

Lock and Unlock

Prevent accidental deletion of data?

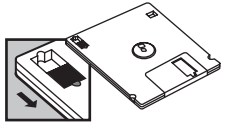
Yes

Lock the disk.



No

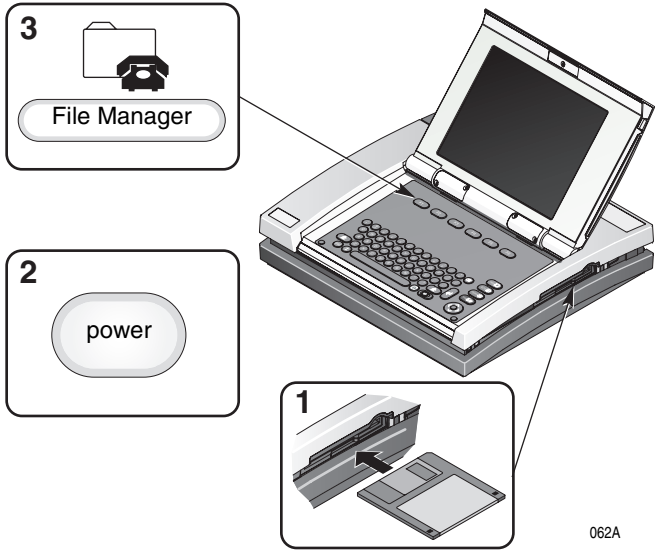
Unlock the disk to format. You can now store or delete data.



006A, 110A, 109A

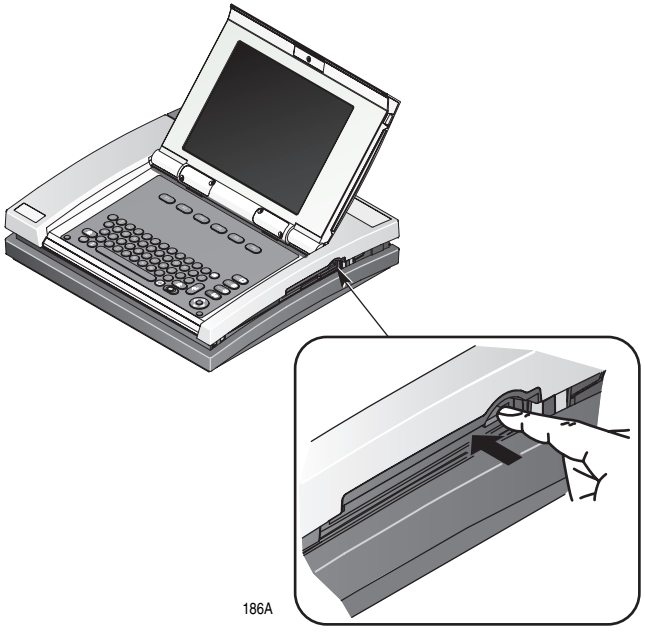
Format

✓ The system will automatically ask if you want to format an unformatted disk.



062A

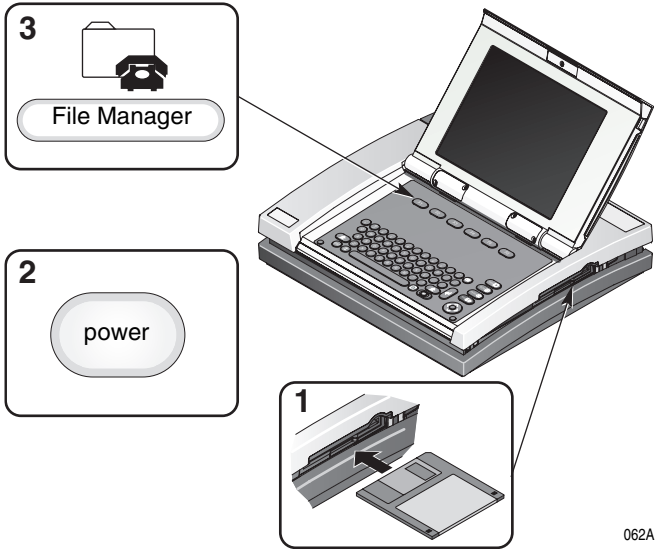
Eject a Disk From the Drive Slot



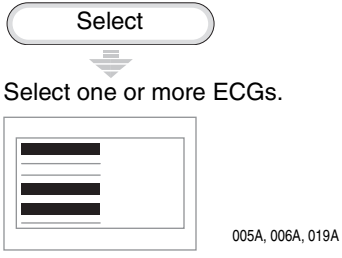
186A

Display Stored ECGs

Preparation



Select the ECGs



Display the ECGs

✓ *Medians, Rhythm,* and *Text* functions are not available for the signal averaged ECGs.

Display

005A, 006A

To Print the ECG

Print

005A, 006A

To Display Medians or Rhythm Data

Medians

or

Rhythm

005A, 006A

To Display Measurement and Analysis Statements

Text

005A, 006A

To Display the Next Selected ECG

Next

005A, 006A

To Return to the Main Menu

Return

Main Menu

005A, 006A

To Display ECGs From a Different Disk

New Disk

005A, 006A, 071A

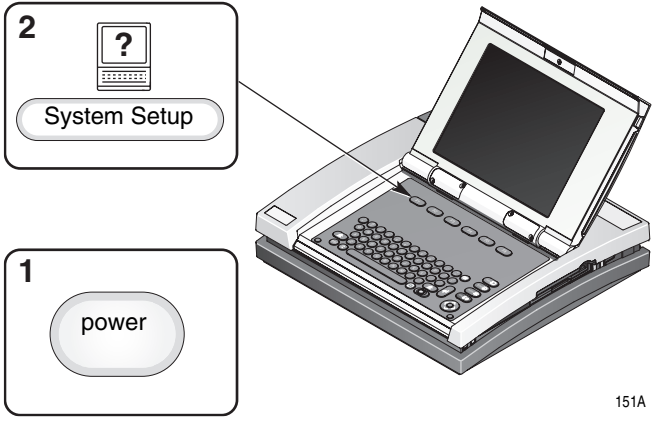
14 Defining the System Setup

For your notes

To Use the System Setup Function

Select the System Setup Function

Preparation



151A

Enter the System Setup Password

Type the password.

Is the password correct?

Yes

Select a menu function.

No

More

System Setup

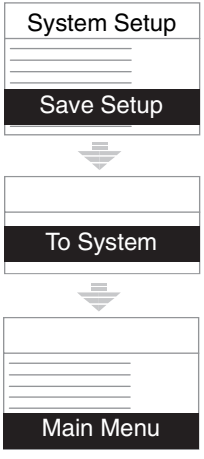
Type the password.

005A, 006A

Define the System Parameters

Use the information contained in this chapter to define your system's operating parameters.

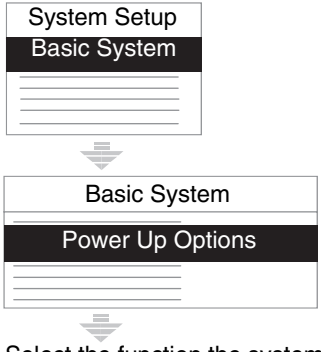
Save Your Changes



006A, 026A, 027A, 028A

Program the System to Automatically do a Task

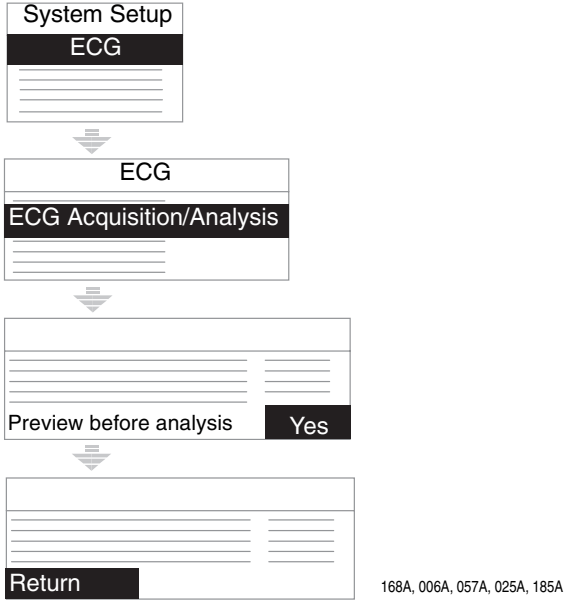
To Power Up the System into a Specific Resting Function



Select the function the system always uses when you power on your system.

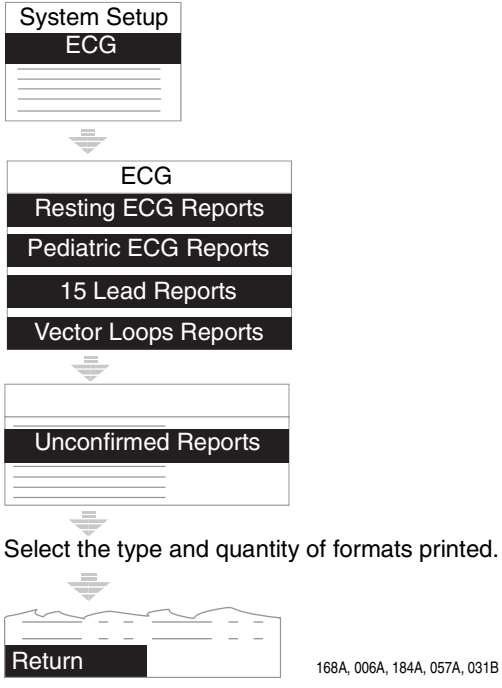
168A, 006A, 057A, 022A

To Preview ECG Data Before Analysis



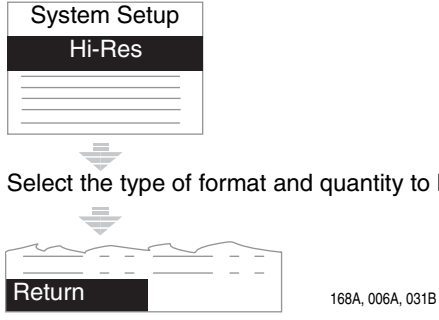
168A, 006A, 057A, 025A, 185A

To Print a Resting ECG Report



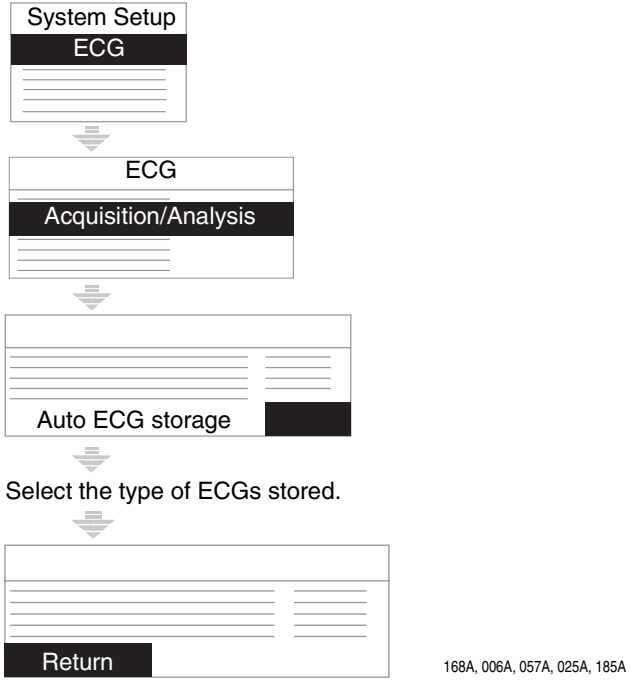
168A, 006A, 184A, 057A, 031B

To Print a Signal Averaged ECG Report



168A, 006A, 031B

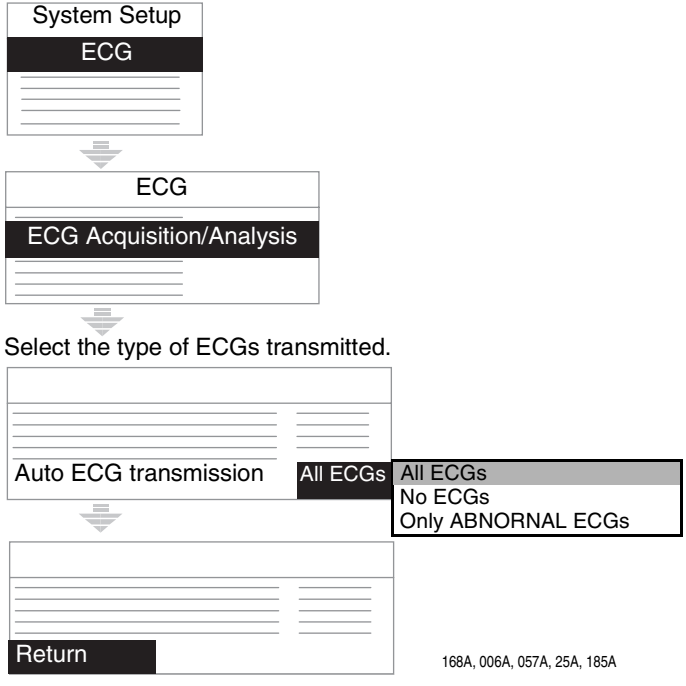
To Store an ECG



168A, 006A, 057A, 025A, 185A

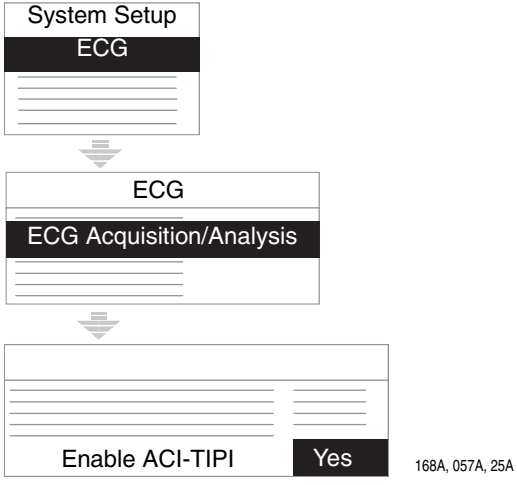
To Transmit an ECG

✓ Before programming your system to automatically transmit an ECG, you must define the receiving device and it's default location. See "Transmission" on page 14-13 to define the transmission parameters of the default receiving device.



168A, 006A, 057A, 25A, 185A

Enable or Disable the ACI-TIPI Option



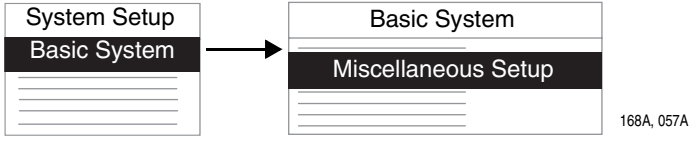
168A, 057A, 25A

Select *Yes* to enable the ACI-TIPI Option; select *No* to disable the ACI-TIPI Option.

Define the Basic System Setup

Miscellaneous Setup

Select this function to define your system's basic set up items.



168A, 057A

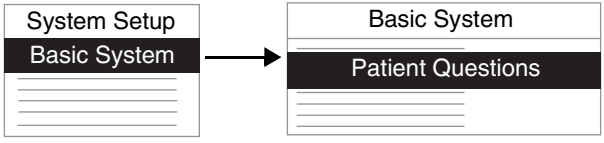
Item	Description
Institution name	Type the name of your hospital, clinic, etc. as you want it to appear on printed reports. On most reports the institution name appears at the top.
Text entry	Select *Uppercase* only to type text in uppercase letters. Select *Upper and lowercase* to type text in upper and lowercase letters.
Speaker volume	Select *Low* to set the system's speaker to low volume. Select *High* to set the system's speaker to high volume.

Item	Description
External video port	Select *Option 1* to enable this port. Most remote monitors function using *Option 1*. Otherwise, select *Option 2*.
Information line	Select *Yes* to enable the help information line on the screen.
Cart number	Type a number that identifies this system.
Site number	Type a number from 1-32 to identify where the data will be stored in the MUSE CV system.
Location number	Type a number to identify the location of this system to a MUSE CV system. Use a value from 1-99 for MUSE CV systems using software version 002B-004 or 3A/CLM-1B. Use a value from 0-599 for a MUSE CV system using software version 4A or later.
File Manager sort	Select the sorting method your system uses to display stored ECGs.
Delete after transmit	Select *Yes* to delete an ECG after transmitting it to a receiving device.
Text on bottom	Select *Yes* to print the ECG test information on the bottom of the ECG reports.

Item	Description
Print barcodes	Select *Yes* if you want the patient information printed in a barcode format.
Automatic Shutdown	Type a number (x) greater than zero to enable the battery conservation mode. If a key is not pressed within (x) minutes, your system will automatically power off. Only patient data is saved when the system powers off.
Serial power always on	Select *Yes* to enable continuous power to the serial ports.
System password	Type a 6-character password that allows you to access the *System Setup* and *Delete* functions. The *System password* that is set at the factory is “system.”
Overread password	Type a 6-character password that allows you to access the *Delete* function. The *Overread password* that is set at the factory is “ovread.”

Patient Questions

Select this function to define what patient prompts appear when you select *Patient Data* in the Resting ECG application.



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Item	Description
ID Required	Select *Yes* to require the user to enter the patient’s identification number before an ECG can be recorded.
ID length	Type the number of alpha-numeric characters used in the patient identification number. Use from 3-16 characters.
Age	Choose the method to enter the patient’s age: ■ Select *Date of birth* to enter age in day-month-year-order. ■ Select *Age in years* to enter age in years, months, weeks, days, or hours.
Gender	Select *Yes* to display a prompt asking whether the patient is male or female.
Height	Select *Yes* to display a prompt asking the patient’s height.

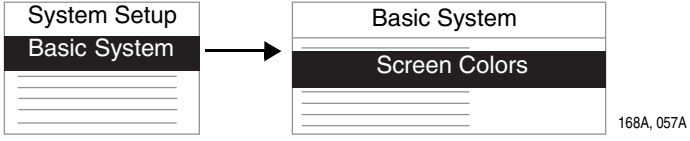
Item	Description
Weight	Select *Yes* to display a prompt asking the patient's weight.
Height/Weight in	Choose the units of measurement defining the patient's weight: ■ Select *in./lb.* to enter the patient's height and weight in inches and pounds. ■ Select *cm./kg.* to enter the patient's height and weight in centimeters and kilograms.
Race	Select *Yes* to display a prompt asking the patient's race. ✓ Our equipment contains several fields which can be filled in before performing an ECG. Some of these fields must be filled in before performing an exam, some are optional and therefore left to the user to assess whether they are needed to perform the exam. A field *RACE* is one of these optional fields. It has been acknowledged by the medical profession as useful to analyze some pathologies. You should be aware that, in some jurisdictions, the processing of data revealing an individual's racial origin is subject to legal requirements, such as obtaining the patient's prior consent. If you elect to collect this type of data, it is your responsibility to ensure that you comply with all applicable legal requirements.

Item	Description
Blood pressure	Select *Yes* to display a prompt asking the patient's systolic and diastolic blood pressures.
Medications	Select *Yes* to display a prompt asking what medications a patient is taking.
Referred by name and number	Select *Yes* to display a prompt asking who referred the patient.
Test indication	Select *Yes* to display a prompt asking the reason for the test.
Patient History	Select *Yes* to display a prompt asking the patient's history.
Technician	Select *Yes* to display a prompt asking the name of the technician who recorded the ECG.
Location	Select *Yes* to display a prompt asking the this system's location number.
Room number	Select *Yes* to display a prompt asking the patient's room number.
Options	Select *Yes* to prompt the user to enter an options number for this ECG. You can define this number to mean whatever you want.
Order number	Select *Yes* to prompt the user to enter an order number for this ECG.

Item	Description
Secondary ID	Select *Yes* to prompt the user to enter a second ID for this ECG.
Extra questions	Define these patient data prompts in one of three ways: ■ Select *Numbers and letters* to answer the prompt using numbers and letters. ■ Select *Numbers only* to answer the prompt using only numbers. ■ Select *Yes* or *No* to answer the prompt using either yes or no.

Screen Colors

Select this function to display one of three color options.



Item	Description
Screen colors	Define the screen colors you want to system to display. ■ Select *Monochrome* to view white screen elements. ■ Select *Option 1* to view white, green, yellow, and red screen elements. ■ Select *Option 2* to view white, yellow, and red screen elements.

Transmission

Select this function to define your system's transmission parameters.

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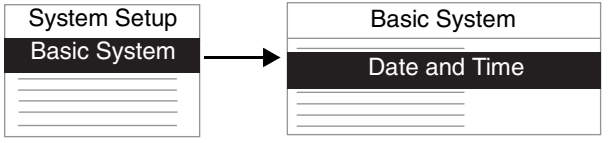
Item	Description
Modem Speaker	Choose when you want to hear the modem tones: ■ Select *On* to hear the modem tones. ■ Select *Off* to prevent hearing the modem tones. ■ Select *Dialing only* to hear the modem tones while your system dials a telephone number.
Dialtone required	Select *Yes* when the system is connected to telephone lines that have a dialtone.
Dialtone method	Select the dialtone method used by your telephone line.
Fax error correction	Select *Yes* if the facsimile machine you transmit ECGs to uses an error correction factor.
, - Two second pause	Type a comma (,) in a telephone number to create a 2-second pause. This can be used to wait for a dialtone. For example, the telephone number 9,3216788 will have a 2-second pause between the numbers 9 and 3.
Phone number	Type from one to six telephone numbers(s) you frequently transmit to.
Location	Type the name of location(s) you transmit to.
Type	Choose the type of modem your system uses to transmit data to a receiving device. ■ Select the *MUSE NETWORK* modem to transmit to a MUSE CV system. ■ Select *Fax machine* to transmit to facsimile machine.
Use IR for serial line	Select *Yes* to enable the local infrared communication.
Serial line baud rate	Select *9600* baud rate to transmit or receive data between another MAC 5000 or a MUSE CV system.
Default Location	Select the default receiving device your system transmits ECGs to. ✓ To transmit by local infrared communication or by local cable, select Serial line (MUSE).

Date and Time

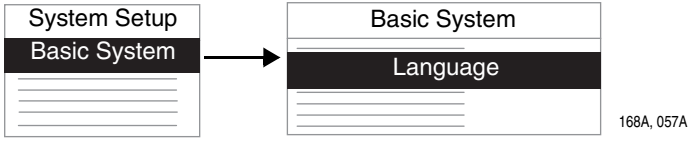
Select this function to set the date and time that appears on the ECG reports.



Item	Description
Current date	Enter the current date: 1. Type the day. 2. Select the month. 3. Type the year.
Current time	Enter the current time: 1. Type the hour. 2. Type the minutes.

Language

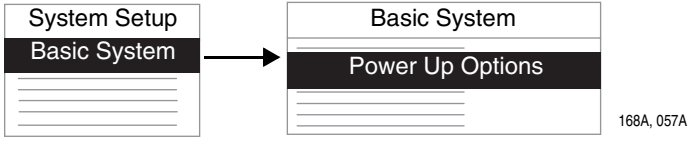
Select this function to choose the language displayed on screen and in ECG reports.



Item	Description
Select new language	Select the language of displayed or printed data. ✓ Power the system off then on to view the new language.

Power Up Options

Select this function to program your system to power up into either the resting, pediatric, vector loops, or 15 lead (option) ECG function.



Item	Description
Power Up Application	Select the resting ECG function you want your system to start up in every time you power on the system.

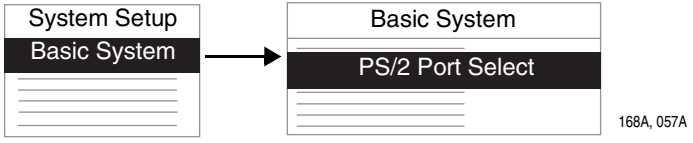
Order Manager Interface

Select this function to acquire, print, and store ECG orders received from a MUSE CV system. The MUSE CV system must use a Hospital Information System (HIS).

Item	Description
Initial sort value	Select how you want to sort displayed ECG orders.
Create orders locally	Select *Yes* to allow ECG orders to be entered manually into the system.

PS/2 Port

Select this function to select the optional card reader configuration.



Item	Description
PS/2 Port Device	Select the input device connected to the PS/2 port (keyboard or card reader).
Card Reader Configuration	Select *Automatic* or *Manual* configuration of the optional card reader.

Define the ECG Setup

ECG Acquisition/Analysis

Select this function to define the ECG acquisition and analysis parameters.

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Item	Description
Baseline roll filter	Use this filter to remove baseline sway. ✓The higher the setting, the more the filter smooths out a wandering baseline. This filter does NOT distort the ST segment displayed on the ECG reports.
Pre-acquisition	Select *Yes* to begin acquiring ECG data as soon as the leadwires are connected to a patient.The system does not wait until the user presses **ecg** before it starts acquiring ECG data. The latest 10 seconds of ECG data is ready for analysis when *Pre-acquisition* is turned on.

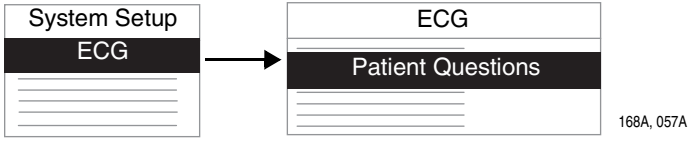
Item	Description
Disable auto gain check	Select *No*, to display a prompt after the user presses **ecg** if the gain of the recorded ECG data is either too high or too low. The user can adjust the gain.
Disable lead off check	Select *No* to display a screen message when the system detects a disconnected leadwire.
Baseline wander warning	Select *Yes* to display a screen message when the system detects a wandering baseline.
Muscle tremor warning	Select *Yes* to display a screen message when the system detects muscle tremor.
AC filter	Use this filter to remove AC line artifact.
AC noise level warning	Select *Yes* to program the system to check for alternating current interference when recording an ECG.
Screening criteria	Select *Yes* to prevent specific 12SL analysis statements from appearing on ECG reports.
See Appendix C to identify these statements.	
Suppress NORMAL statement	Select *Yes* to prevent the *Normal ECG* 12SL analysis statement from appearing on printed, stored, and transmitted ECG reports.

Item	Description
Suppress ABNORMAL and BORDERLINE statements	Select *Yes* to prevent the *Abnormal ECG* and *Borderline ECG* 12SL analysis statements from appearing on printed, stored, and transmitted ECG reports.
Pacemaker pulse enhancer	Select *Yes* to detect very small pacemaker pulses. However, when *Pacemaker pulse enhancer* is on, the system should NOT be close to equipment emitting high frequency radiation. High frequency radiation can interfere with pacemaker pulse detection.
Preview before analysis	Select *Yes* to allow the user to always preview a recorded ECG before the system analyzes the data.
Storage format	Choose the data compression format of the ECGs stored on a MUSE CV system: ■ Select *500 Hz* (*MUSE Network*) to transmit ECGs to a MUSE CV system using MUSE software versions 004A or later. ✓ The *Storage format* item does not display if the MAC 5000 has the ACI-TIPI option installed. With ACI-TIPI, you can only store 500 Hz ECGs.

Item	Description
Auto ECG storage	Choose the ECGs you want your system to automatically store to a disk: ■ Select *All ECGs* to automatically store a recorded ECG. ■ Select *No ECGs* to disable automatic storage of a recorded ECG. ■ Select *Only ABNORMAL ECGs* to automatically store a recorded ECG that the 12SL analysis program has classified as abnormal.
Auto ECG transmission	Choose the ECGs you want your system to automatically transmit: ■ Select *All ECGS* to automatically transmit a recorded ECG. ■ Select *No ECGS* to disable automatic transmission of a recorded ECG. ■ Select *Only ABNORMAL ECGs* to automatically transmit a recorded ECG that the 12SL analysis program has classified as abnormal.
Enable ACI-TIPI	Select *No* to disable the ACI-TIPI function. Select *Yes* to enable the ACI-TIPI function. ✓ This is an option and might not be installed on your unit.

Patient Questions

Select this function to define two alpha-numeric patient data prompts.



Item	Description
Prompt	Type the text you want for the patient question.
Type	Select the type of response you want entered for the patient question. ■ Select *Numbers and letters* to answer the prompt using numbers and letters. ■ Select *Numbers only* to answer the prompt using numbers. ■ Select *Yes* or *No* to answer the prompt using either yes or no.

Writer Setup

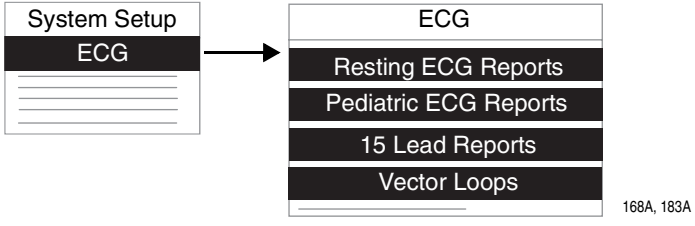
Select this function to change the writer's speed, gain, and filter settings.

Item	Description
Speed	Select the writer's default speed setting in millimeters per second.
Gain	Select the writer's default gain setting. ✓ For the *10/5* setting, limb leads appear at 10 mm/mV and precordial leads appear at 5 mm/mV.
Filter	Select the writer's default filter setting. ✓ The screen filter is always set to 40 Hz.

Resting, Pediatric, 15 Lead, and Vector Loops ECG Reports

Select this function to:

- Specify the leads displayed on reports.
- Choose the unconfirmed and confirmed report formats.
- Identify the three auxiliary leads used to acquire a 15 lead ECG using the *15 lead ECG* function (option).
- Set up the parameters specific to *Vector Loops Reports* (option).



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Report Leads

Item	Description
Standard leads	Select the standard leads you want to appear on the ECG reports. ✓ When you change a channel's lead, the new lead appears on all the ECG reports displaying that channel.
Rhythm reports	Choose the type of data displayed in the *Rhythm* reports. ■ Select *Real time* to print current ECG data on the *Rhythm* reports. This allows you to print the data you see on the screen. ■ Select *10 sec delayed* to print ECG data delayed by 10 seconds.

Item	Description
Rhythm leads	Choose a lead option for each group to determine the rhythm leads that print when you select the **rhythm** key in an application. The six defined groups make up the display list when you select *Leads in the Resting, Pediatric, 15 Lead,* or *Vector Loops Application*. ■ Select *3 leads* to define which three leads in a three lead Rhythm report print. ■ Select *6 leads* to define which six leads in a six lead Rhythm report print. ■ Select *All leads* to display and print 10 seconds of data for 12 (or 15) leads. ■ Select *Lead Check* to display and print real time data for each of the 12 (or 15) leads. ■ Select *Lead Placement* to display and print real time data for each of the 12 (or 15) leads and to display the chest electrode placement.
Autorhythm	Select the group of *Rhythm leads* printed in the *Autorhythm* report.

Item	Description
RMR/CGR/extra rhythm leads	Select the rhythm lead(s) you want printed in the *RMR* and *CGR* reports. ✓ When you change a rhythm lead, the new lead appears on all reports displaying that lead. For example, if you select *V5* for *RMR/CGR/extra rhythm lead 1*, then the *V5* waveform appears on all reports that include *RMR/CGR/extra rhythm lead 1*.
Swedish format rhythm leads	Select the rhythm lead(s) you want printed in the *Swedish format* reports. ✓ When you change a rhythm lead, the new lead appears on all reports displaying that lead. For example, if you select *V5* for the *Swedish format rhythm lead 1*, then the *V5* waveform appears on all reports that include *Swedish format rhythm lead 1*.

Confirmed Reports

Item	Description
Report formats	Choose the report formats you want to print after an ECG has been confirmed. ■ Select whether you want the report to print with or without interpretation (12SL analysis statements). ■ Type a value between 0 and 10 for the number of copies you want to print for each report format.

Unconfirmed Reports

Item	Description
Normal ECG Reports	Choose the report formats your system automatically prints after you press ECG. ■ Select whether you want the report to print with or without interpretation (12SL analysis statements). ■ Type in the number of copies you want to print for each report format.
Abnormal ECG Reports	Choose the report formats your system automatically prints when an abnormal ECG is detected. ■ Select whether you want the report to print with or without interpretation (12SL analysis statements). ■ Type in the number of copies you want printed.
Confirmation text	Choose the text that appears on an ECG report that indicates the status of the ECG. ■ Select *Unconfirmed* to indicate that the ECG report is not confirmed by a physician. Once an ECG is confirmed, the word *Confirmed* appears on the ECG report. ■ Select *Reviewed by* to display the reviewer's name on a confirmed ECG report. If the ECG report is not confirmed, then no name appears.

Extra Leads (15 Lead ECG Option Only)

Item	Description
Lead Set	Choose the three additional leads used. You can: ■ select one of the pre-defined lead sets, or ■ select *Custom 3* to define the electrode positions of A1, A2, and A3.

Vector Loops (Vector Loops Option Only)

Item	Description
Number of copies	Type a value between 0 and 10 for the number of copies you want to print for this report format.
Main loop gain	Select a default setting.
Lead Z display	Select a default setting.
Sagittal plane	Select a default setting.

Analog Outputs

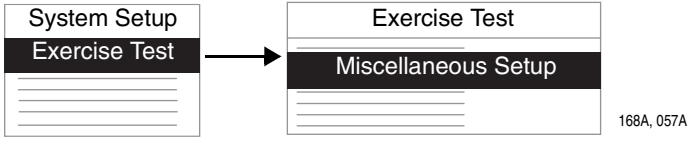
Select this function to define the system's output signals when connecting additional equipment to the system.

Item	Description
Fast Analog Output	Select *Not Used, I, II,* or *V1-V6*.
TTL Output	Select *Not Used* or *QRS Detect* to define *TTL Output*.
Polarity	Select *Positive* or *Negative* to define *TTL Output* polarity.
Width	Type a value between 0 and 48 to define *TTL Output* signal width in milliseconds.
Delay	Type a value between 0 and 100 to set a delay in milliseconds for the *TTL Output* QRS detector signal.
QRS Beep	Select *On* to hear a beep for each QRS complex.

Define the Exercise Test Setup (Option)

Miscellaneous Setup

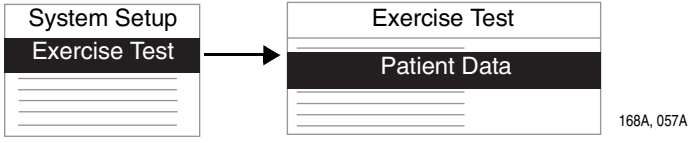
Select this function to define your system's basic exercise test set up items.



Item	Description
Timeout Interval	The time it takes for a menu or prompt to "disappear" from the screen when it is not being used. You may type in a value between 15 and 600 seconds.
Cubic Spline	Select Yes to turn on the baseline control option.
Event names:	This allows you to create a list of event names, any of which may be selected to label a patient episode during an exercise test.
Reason for Termination:	This allows you to create a list of reasons for termination of the exercise test. Select the appropriate reason at the end of the test.

Patient Data/Questions

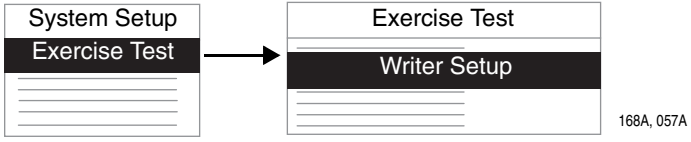
Select this function to define two *Yes/No* and two alpha-numeric patient data prompts.



Item	Description
Max Pred HR	Select *Yes* to ask the patient's maximum predicted heart rate.
Target Heart Rate	Select *Yes* to ask the patient's target heart rate. Enter the percentage of maximum predicted heart rate.
Extra questions	In addition to the patient questions defined under *Basic System*, there are 2 patient data prompts that you can define. Each of the prompts can be answered in 3 ways: ■ *Numbers and letters* = the answer to the prompt can be made up of numbers and letters. ■ *Numbers only* = the answer to the prompt can only be in numbers. ■ *Yes* or *No* = the answer to the prompt must be yes or no.

Writer Setup

Select this function to change the writer's speed, gain, and filter settings. You can also enable or disable reporting tools.



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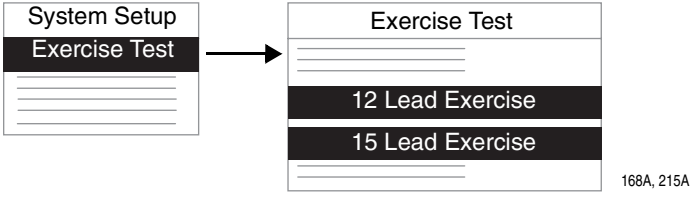
Item	Description
Speed	Select the writer's default speed setting in millimeters per second.
Gain	Select the writer's default gain setting. ✓ For the *10/5* setting, limb leads appear at 10 mm/mV and precordial leads appear at 5 mm/mV.
Filter	Select the writer's default filter setting. ✓ The screen filter is always set to 40 Hz.
Arrhythmia Doc.	Select *On* to automatically print a report when an arrhythmia occurs during the exercise test.
Tic marks	Select *Yes* to add tic marks on the E, J, and J-plus-a-measurement points.

Item	Description
ST Measurements	Select *Yes* to enable screen and writer ST measurements.
Post J	Enter a value between 0 and 200 for the value in milliseconds where ST measurement is to be taken.
Writer	ON / OFF

12 and 15 Lead Exercise Reports

Select this function to:

- Identify the three auxiliary leads used to acquire a 15 lead exercise ECG using the *15 lead ECG* function (option).
- Specify the leads displayed on exercise reports.



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Extra Leads (15 Lead ECG Option Only)

Item	Description
Lead Set	Choose the three additional leads used. You can: ■ select one of the pre-defined lead sets, or ■ select *Custom 3* to define the electrode positions of A1, A2, and A3.

Report Leads

Item	Description
Standard leads	Select the standard leads you want to appear on the ECG reports. ✓ When you change a channel's lead, the new lead appears on all the ECG reports displaying that channel.
Rhythm reports	Choose the type of data displayed in the *Rhythm* reports. ■ Select *Real time* to print current ECG data on the *Rhythm* reports. This allows you to print the data you see on the screen. ■ Select *10 sec delayed* to print ECG data delayed by 10 seconds.

Item	Description
Rhythm leads	Choose a lead option for each group to determine the rhythm leads that print when you select the **rhythm** key within an application. The six defined groups make up the display list when you select *Leads in the Resting, Pediatric, 15 Lead,* or *Vector Loops* Application. ■ Select *3 leads* to define which three leads in a three lead Rhythm report print. ■ Select *6 leads* to define which six leads in a six lead Rhythm report print. ■ Select *All leads* to display and print 10 seconds of data for 12 (or 15) leads. ■ Select *Lead Check* to display and print real time data for each of the 12 (or 15) leads. ■ Select *Lead Placement* to display and print real time data for each of the 12 (or 15) leads and to display the chest electrode placement.
Autorhythm	Select the group of *Rhythm leads* printed in the *Autorhythm* report.

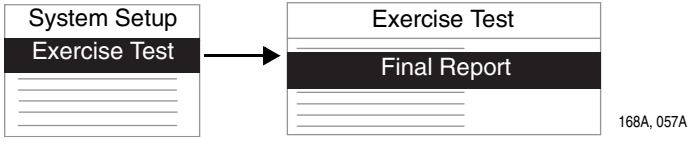
Item	Description
RMR/CGR/extra rhythm leads	Select the rhythm lead(s) you want printed in the *RMR* and *CGR* reports. ✓ When you change a rhythm lead, the new lead appears on all reports displaying that lead. For example, if you select *V5* for *RMR/CGR/extra rhythm lead 1*, then the *V5* waveform appears on all reports that include *RMR/CGR/extra rhythm lead 1*.
Swedish format rhythm leads	Select the rhythm lead(s) you want printed in the *Swedish format* reports. ✓ When you change a rhythm lead, the new lead appears on all reports displaying that lead. For example, if you select *V5* for the *Swedish format rhythm lead 1*, then the *V5* waveform appears on all reports that include *Swedish format rhythm lead 1*. ✓ When printing or storing 3 lead median or trend reports, the first three Swedish format rhythm leads are used. When printing or storing 6 lead median reports, all six of the Swedish format rhythm leads are used.

Exercise Reports

Allows you to choose the report you wish to print with the 12-lead or optional 15-lead exercise tests.

Final Report

Use the *Reports* function to set up the types of reports you want to print with the final report. These reports print during the *TEST-END* phase.



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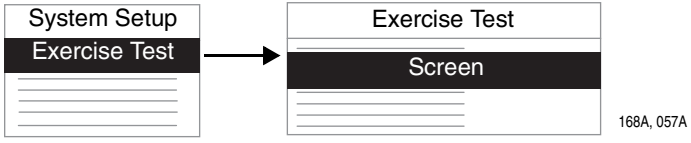
Item	Description
Storage Option	Select *Store strips and final report, Store final report only,* or *No storage of test data* to store in-test strips or final reports to diskette.
Final Report Preview	Select *No Preview Report, Summary Report, Tabular Report, Selected Medians, Trend & Medians, Median Report,* or *Trend Report* format to print as a preview report before *Reason for Termination* and *Comments* are entered and all final reports are printed at test end.

Item	Description
Summary Report	Enter the number of copies to be printed. Select either *Resting and Max ST Medians* or *Resting and Peak Exercise Medians* format for the final summary report.
Tabular Report	Enter the number of copies to be printed.
Selected Medians	Enter the number of copies to be printed.
Trend & Medians	Enter the number of copies to be printed.
Median Report Leads	Enter the number of copies to be printed. Then, select either *3, 6,* or *All* leads for the median report. *All* means that the report has either 12 or 15 leads. Fifteen leads appear only if extra leads — such as X, Y, or Z — were chosen in *Basic System* setup.
Trend Report Leads	Enter the number of copies to be printed. Then, select either *3* or *All* leads for the trend report.
ST-HR Loops	Enter the number of copies to be printed.
ST/HR Report	Enter the number of copies to be printed for the ST/Heart Rate Slope report.

Screen

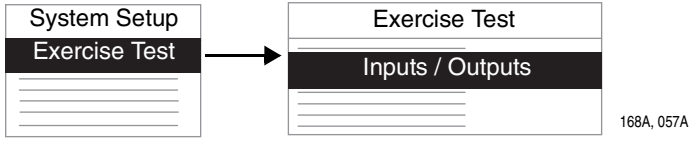
Use the *Screen* function to define how your exercise ECGs are displayed on your screen.



Item	Description
Display Rhythm Medians	Select *Yes* to display a median complex on the screen in front of Rhythm Lead 1, 2, and 3 during an exercise test.
Screen Filter	Select 20 or 40 Hz to set the screen filter.

Inputs / Outputs

Define *Inputs / Outputs* when you connect additional equipment, like an ergometer, to your MAC 5000 system.

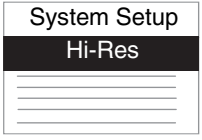


Item	Description
Slow Analog Output	Select *Not Used, DC Heart Rate, Workload, Speed (x1), Speed (x3),* or select *Grade* to define DC heart rate, ergometer workload, treadmill speed, or treadmill grade. ✓ If using exercise protocols for an ergometer or an analog treadmill (see Chapter 7, "Edit Protocols Options") you must configure the slow and fast analog output properly to control the workload device. For ergometers the analog output should be configured for workload, for analog treadmills the analog outputs should be configured for speed and grade.

Item	Description
Fast Analog Output	Select *Not Used, DC Heart Rate, Workload, Speed (x1), Speed (x3), Grade,* or select one of the following leads: *I, II, V1, V2, V3, V4, V5*, or *V6*. Attach an acquisition module to the MAC 5000 system in order to use this output.
Blood Pressure	Select *Manual, Ergoline Ergometer, Suntech,* or *Nipon-Colin*. ✓ If selecting the Suntech blood pressure device, the blood pressure device must be configured to use the Ergoline emulation mode. (See the Suntech blood pressure device Operators Manual.)
TTL Output	Select *Not Used, QRS Detect,* or *BP Prompt* to define *TTL Output*. ✓ If selecting any of the external blood pressure devices, the TTL output must be configured to provide a QRS Trigger that meets the specifications of the blood pressure device. (See the blood pressure device Operators Manual for TTL trigger specifications.)
Polarity	Select *Positive* or *Negative* to set *TTL Output* polarity.
Width	Enter a value from 4–48 milliseconds to define *TTL Output* signal width.
Delay	Type a value between 0 and 100 to set a delay in milliseconds for the *TTL Output* QRS detector signal.
QRS Beep	Select *On* to hear a beep for each QRS complex.

Define the Signal Averaged ECG Setup (Option)

Select this function to define the HI-RES and PHi-Res signal averaged ECG program (options).



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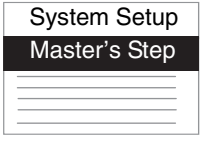
Item	Description
Analysis filter	Select the analysis filter you want to use. GE Medical Systems *Information Technologies* recommends using an analysis filter of *40-250Hz*.
Averaging target	Select the method to average the target.
Target Beat Count	Type a value from 1 to 999. GE Medical Systems *Information Technologies* recommends averaging to a minimum of 250 beats.
Target Noise Level	Type a value from 0.1 to 1.0µV. GE Medical Systems *Information Technologies* recommends averaging to a noise level of 0.3µV.
Correlation Threshold	Select the degree of correlation threshold. GE Medical Systems *Information Technologies* recommends the *Very High* setting.

Item	Description
Final Report	Type a value from 0 to 10 for the number of copies you want to print for each report format.
Prompt	Type the text you want for the patient question.
Type	Select the type of response you want entered for the patient question. ■ Select *Numbers and letters* to answer the prompt using numbers and letters. ■ Select *Numbers only* to answer the prompt using numbers. ■ Select *Yes* or *No* to answer the prompt using either yes or no.

Master's Step Setup (Option)

Select this function to define the parameters for the Master's Step option.



168A

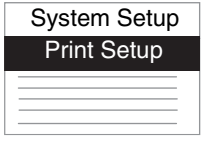
Item	Description
Number of Steps	The number of steps required during the exercise portion of the test. This is calculated from the patient weight, sex and age, but can be changed here.
Test Type	Test length. Select *Single* for 1.5 minute test, *Double* for 3 minute test or *Triple* for a 4.5 minute test.
Post J(ms)	Number of ms after J point. Used to determine the ST level.
Step Counter Display	Select *Up* to display steps taken so far. Select *Down* to display steps to go during exercise.

Item	Description
Continuous Recording	Print rhythm between post exercise ECGs.
Post Exercise ECG Time	The time, in minutes, after the 1st post exercise ECG when a additional ECG should be taken (up to 9 are available). Set any undesired tests to 0.

Miscellaneous Setup

Print Setup

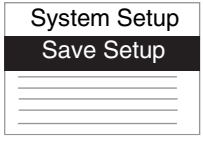
Select this function to print a report of your system's *System Setup* parameters.



168A

Save Setup

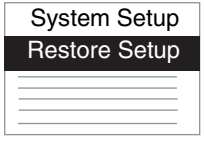
Select this function to save the changes you made to the *System Setup*.



168A

Restore Setup

Select this function to change your system's *System Setup* parameters.



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Item	Description
Restore Setup	Choose the method for changing all of your *System Setup* parameters. ■ Select *To Original Factory Settings* to restore the system to the default GE Medical Systems *Information Technologies* settings. ■ Select *From diskette* to install *System Setup* parameters stored on a disk. ■ Select *Do Not Restore Setup* to exit this function.

For your notes

A Appendix A – Maintenance

For your notes

General

WARNING

Failure on the part of all responsible individuals, hospitals or institutions, employing the use of this device, to implement the recommended maintenance schedule may cause equipment failure and possible health hazards. The manufacturer does not in any manner, assume the responsibility for performing the recommended maintenance schedule, unless an Equipment Maintenance Agreement exists. The sole responsibility rests with the individuals, hospitals, or institutions utilizing the device.

✓ Regular maintenance, irrespective of usage, is essential to ensure that the equipment will always be functional when required.

See the documentation provided with your peripheral equipment for appropriate maintenance procedures.

Inspecting and Cleaning

Precautions

- Turn off the system before inspecting or cleaning.
- Do NOT immerse any part of the equipment in water.
- Do NOT use organic solvents, ammonia based solutions, or abrasive cleaning agents which may damage equipment surfaces.

Visual Inspection

Perform a visual inspection of all equipment and peripheral devices daily. If you notice any items that need repair, contact an authorized service person to make the repairs.

- Check the case and display screen for cracks or other damage.
- Regularly inspect all plugs, cords, cables, and connectors for fraying or other damage.
- Verify that all cords and connectors are securely seated.
- Inspect keys and controls for proper operation.
  - Toggle keys should not stick in one position.
  - Knobs should rotate fully in both directions.

Cleaning

Exterior Surfaces

Clean the exterior surfaces of all equipment and peripheral devices monthly, or more frequently if needed.

1. Use a clean, soft cloth and a mild dishwashing detergent diluted in water.
2. Wring the excess water from the cloth. Do NOT drip water or any liquid on the writer assembly, and avoid contact with open vents, plugs, or connectors.
3. Dry the surfaces with a clean cloth or paper towel.

Disk Drive

Clean the disk drive every six months, or more frequently if you have data storage problems.

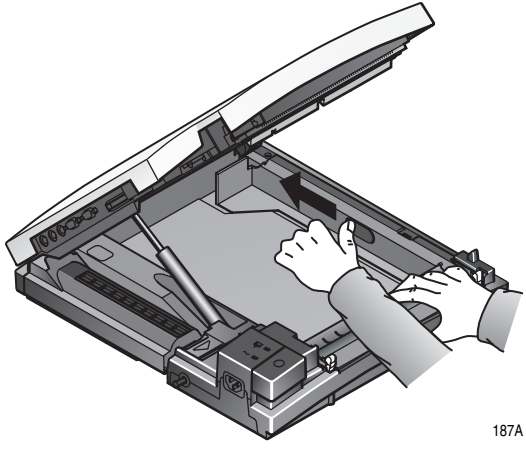
Use the head cleaning kit: PN 407546-001.

✓ Do NOT use cleaning solutions or solvents on the disks. Data loss or disk drive failure could result.

1. Power on the system.
2. Follow the head cleaning kit instructions to prepare the head cleaning disk.
3. Insert the head cleaning disk into the drive slot and note how long the drive spins.
   - The head cleaner disk must spin for a total of 30 seconds to clean the drive.
4. Repeat steps 1-3 until the head cleaning disk spins for 30 seconds or more.
5. Eject the head cleaning disk from the drive slot.

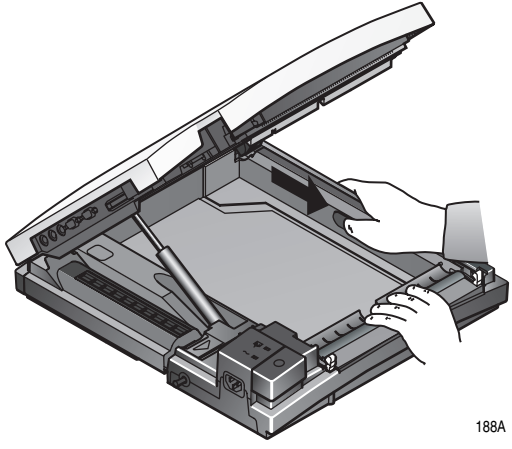
Changing the Paper Tray Size

To Change to A4 Paper Size



187A

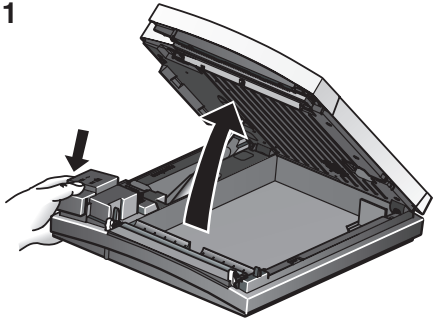
To Change to Standard Paper Size



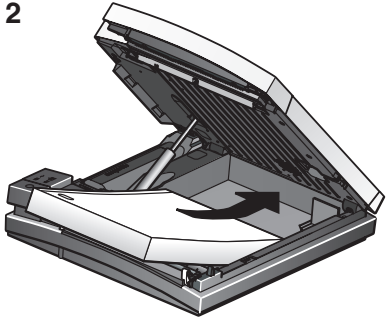
188A

Replacing Paper

1

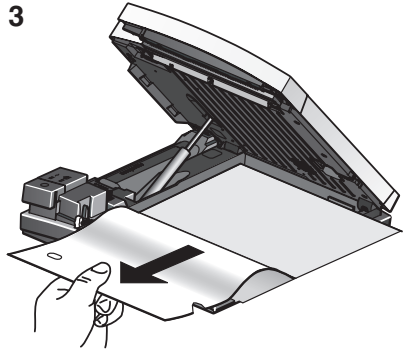


2

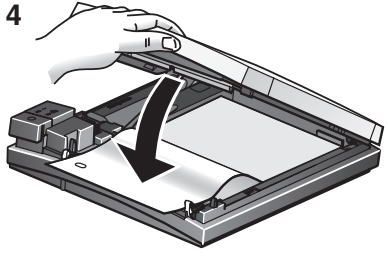


092A, 093A

3



4



094A, 095A

Storing Paper

Thermal Paper

To avoid deterioration or fading of traces follow these precautions.

1. Store in cool, dark, and dry locations. Temperature must be below 80°F (27°C). Relative humidity must be between 40% and 65%.
2. Avoid exposure to bright light or ultraviolet sources such as sunlight, fluorescent, and similar lighting which causes yellowing of paper and fading of tracings.
3. Do NOT store thermal papers with any of the following:
   - carbon and carbonless forms.
   - non-thermal chart papers or any other products containing tributyl phosphate, dibutyl phthalate, or any other organic solvents. Many medical and industrial charts contain these chemicals.
   - document protectors, envelopes, and sheet separators containing polyvinyl chloride or other vinyl chlorides.
4. Avoid contact with: cleaning fluids and solvents such as alcohols, ketones, esters, ether, etc.
5. Do NOT use: mounting forms, pressure-sensitive tapes, or labels containing solvent-based adhesives.

To assure maximum image life, thermal paper should be stored separately in:

- manila folders
- polyester or polyimide protectors.

Plastic document protectors, envelopes, or sheet separators made of polystyrene, polypropylene, or polyethylene will not degrade thermal traces in themselves. However, these materials afford no protection against fading from external causes.

Use only mounting forms and pressure-sensitive tapes made with starch or water-based adhesives.

Paper manufacturers advise us that these thermal products should retain their traces when properly imaged and stored for about 3 - 5 years. If your retention requirements exceed these guidelines, we recommend you consider alternate image storage techniques.

Archivist Paper

The following applies to Archivist thermal paper only.

GE Medical Systems *Information Technologies* warrants that the image produced on Archivist papers by GE Medical Systems *Information Technologies* equipment will not fade for seven (7) years when handled according to the instructions outlined below:

Archivist papers must be continuously stored below 104°F (40°C) and relative humidity must be maintained between 40% and 60%.

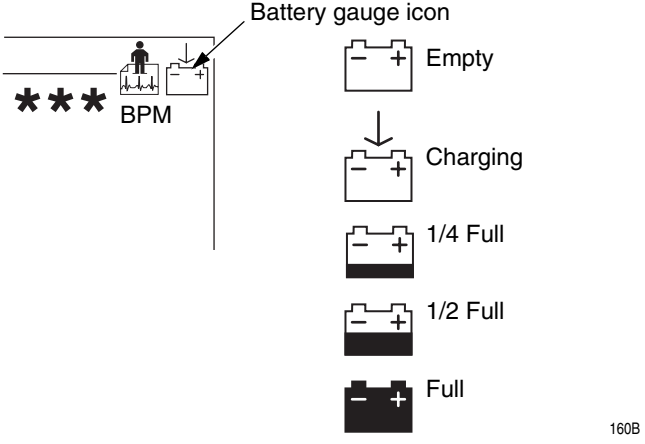
The customer must notify GE Medical Systems *Information Technologies* promptly following any customer knowledge of fading.

The GE Medical Systems *Information Technologies* equipment used shall have periodic maintenance performed in accordance with GE Medical Systems *Information Technologies* service manuals and/or technical memorandums.

Maintaining the Battery

Battery Gauge Icon

The battery gauge icon appears in the upper right corner of the active screen display. The battery gauge tells you how much charge your system's battery has available and when the system is charging the battery.



Charging the Battery

To Fully Charge the Battery

1. Power off the system.
2. Connect the system to an AC wall outlet.
3. Charge the system's battery 4-5 hours or until the battery gauge icon indicates a full charge.

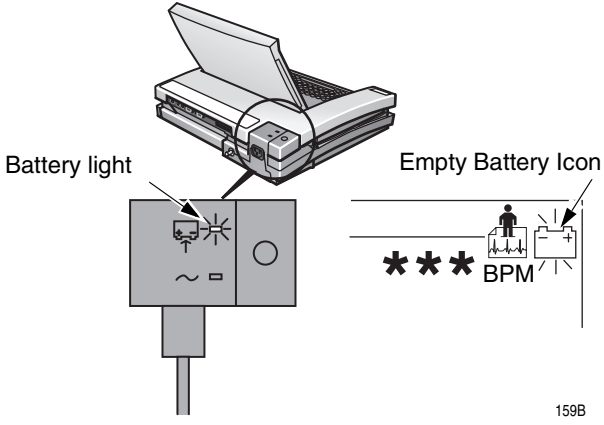
When Should you Charge the Battery?

Before Initial Use To ensure a fully charged battery, charge the system before you use it for the first time.

Between Acquisitions To ensure a fully charged battery, power off the system and connect it to an AC wall outlet until you use the system again. This prolongs battery runtime.

When the Battery is Low The amber battery light and the "empty" battery gauge icon flash intermittently.

✓ The system may run for a long period of time after the "empty" battery icon appears.



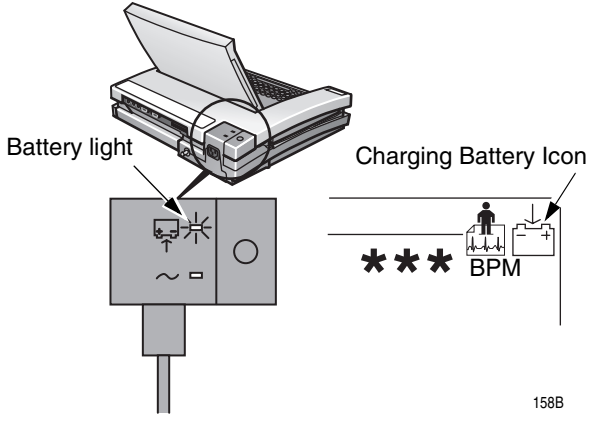
When the Battery is Completely Discharged Your system powers off when the battery is completely discharged. To operate your system, you must connect the system to an AC wall outlet.

Is the Battery Charging?

✓ If the battery is fully charged or exceeds safe charging temperature, the system will not charge the battery.

The system's battery is charging when:

- the amber battery light glows, and
- the battery gauge icon shows the battery charging icon.



Periodic Maintenance

In addition to normal system use, periodic deep discharge cycles may be required to ensure consistent battery performance.

A deep discharge cycle occurs when the battery is discharged until the system shuts down and the battery is charged until it is full.

GE Medical Systems *Information Technologies* recommends one deep discharge cycle once every three months.

- ✓ GE Medical Systems *Information Technologies* does not recommend over-exercising the battery with deep discharge cycles. See the MAC 5000 Service Manual for more battery maintenance and diagnostic information.

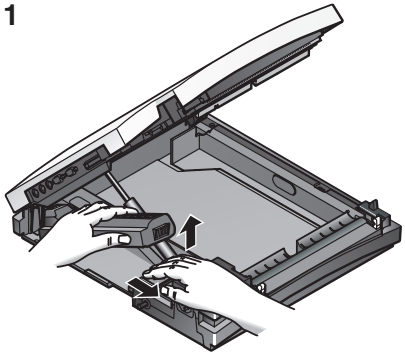
Replacing the Battery

WARNING

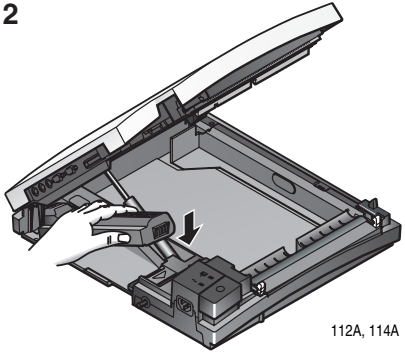
Do NOT dispose of the battery pack by fire or burning. Follow local environmental guidelines concerning disposal and recycling.

- ✓ If battery fluid contacts your skin, eyes, or clothing, immediately wash the area with clean water and see a doctor.
- ✓ To prevent loss of data, remove the AC power cable from the AC wall outlet and power off the system before removing the battery.
- ✓ After removing and replacing the battery, the battery gauge symbol resets to empty. Connect your system to an AC wall outlet to ensure a fully charged battery.

1

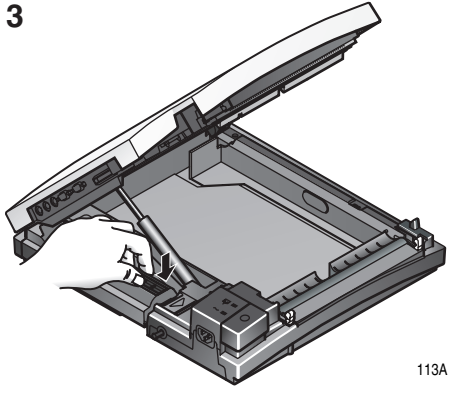


2



112A, 114A

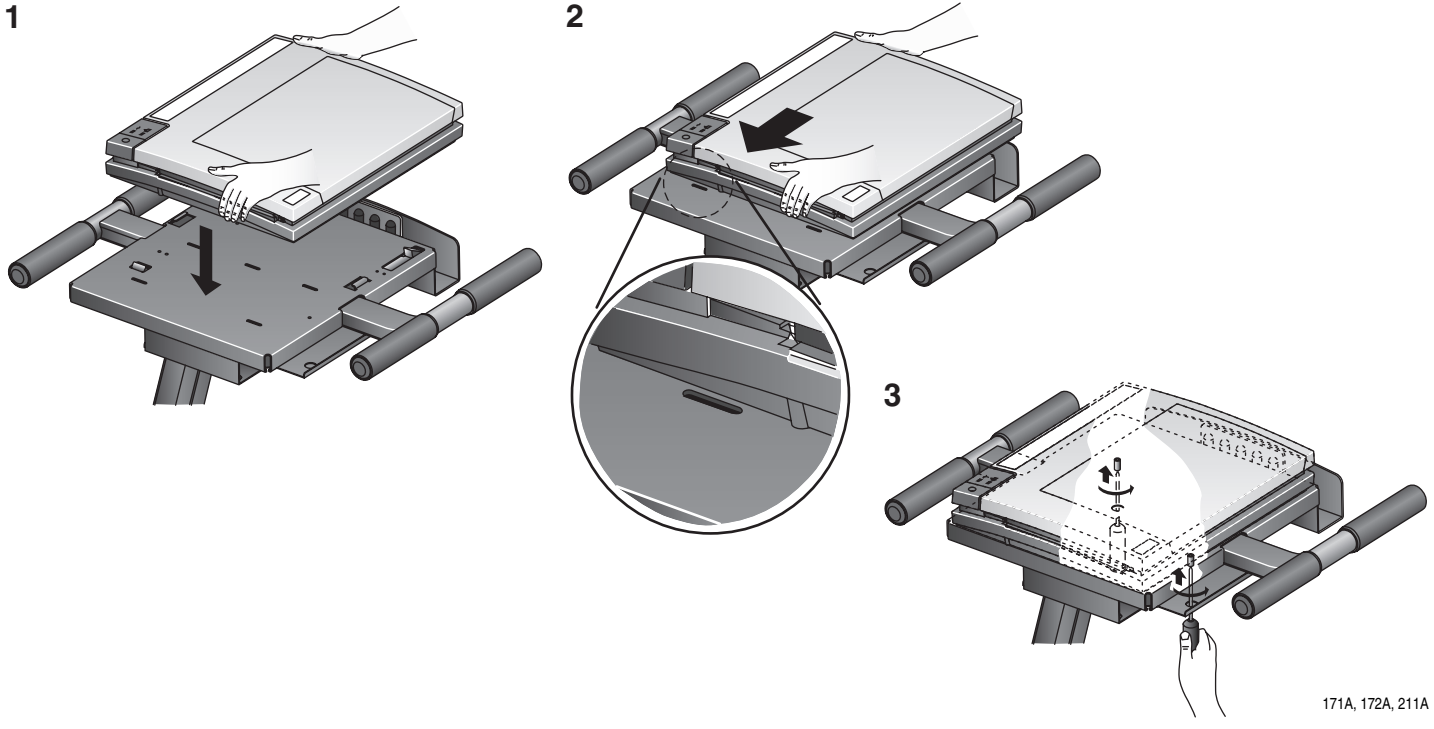
3



113A

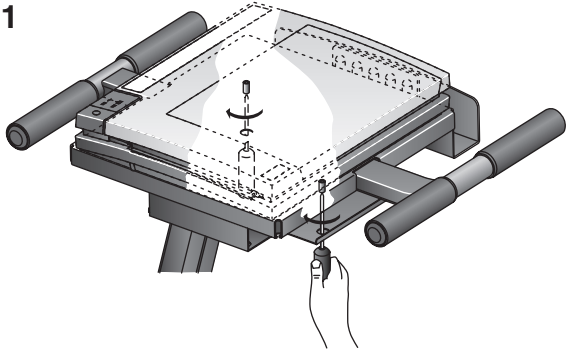
Mounting or Dismounting the Trolley

Mount the System Onto the Trolley

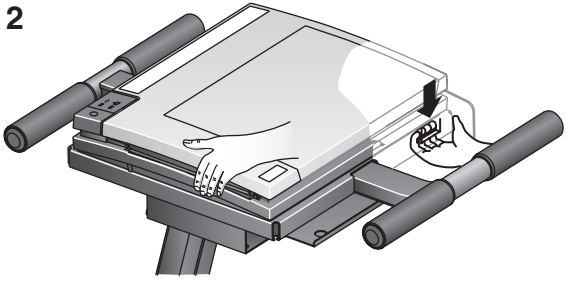


Dismount the System From the Trolley

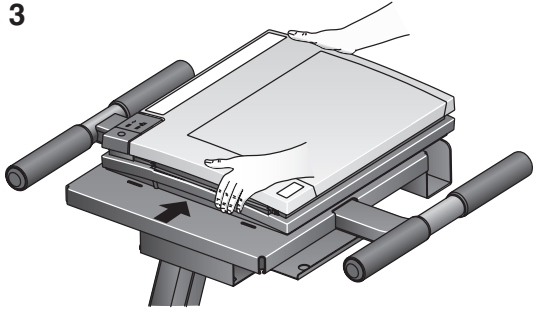
1



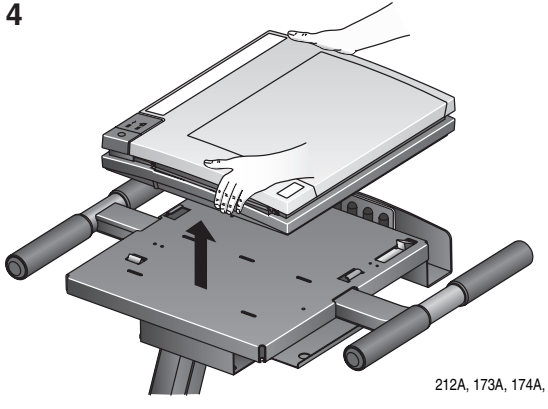
2



3

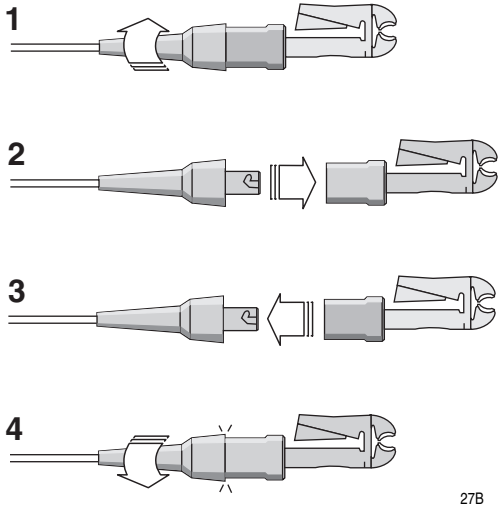


4

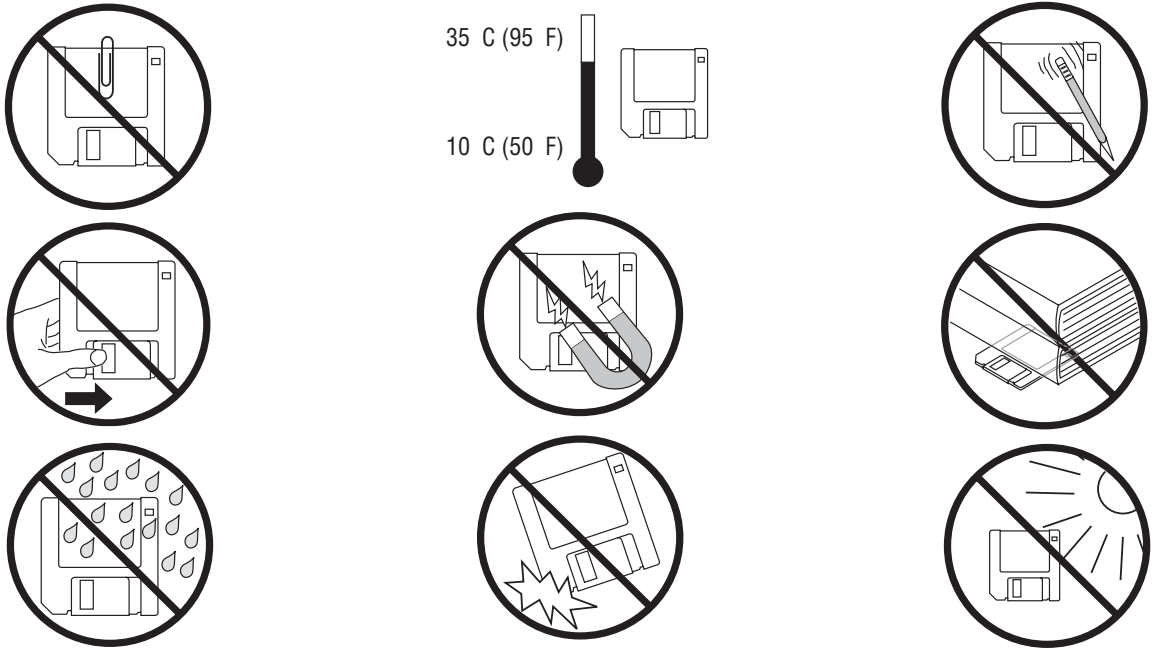


212A, 173A, 174A, 175A

Replacing Acquisition Module Leadwire Adapters



Handling a Disk



001Adisk, 002Adisk, 003Adisk, 004Adisk, 005Adisk, 006Adisk, 007Adisk, 008Adisk, 009Adisk

For your notes

B Appendix B – Troubleshooting

For your notes

Introduction

First Things to Ask

If the system is not working properly, save yourself some time troubleshooting by asking yourself these basic questions.

- Is the unit turned on?
- Have there been any changes in the use, location, or environment of the equipment that could cause the failure?
- Has the equipment's hardware or software been modified?
- Is operator error the cause of the problem? Try to repeat the scenario exactly and compare that to the proper operation of the equipment described in the manual.
- Is the battery installed?
- When connected to an AC wall outlet, does the green AC power light glow?
- Is the writer door closed?
- Is the software card installed?

Visual Inspection

A thorough visual inspection of the equipment can save time. Items such as disconnected cables or missing hardware can frequently cause symptoms and equipment failures that may appear to be unrelated and difficult to track.

For additional information, see "Appendix A – Maintenance" on page A-1.

Equipment Problems

Reducing ECG Data Noise

If the acquired ECG data displays unacceptable noise levels:

- Verify proper electrode placement.
- Verify proper electrode application. Perspiration and dead skin cells must be removed from the electrode site.
- Check for defective or date expired electrodes.
- Check for defective, broken, or disconnected leadwires.
- Check the patient's position. The patient should remain motionless during the acquisition of a resting ECG.

There is No ACI-TIPI Report

- ACI-TIPI is disabled.
  - Enable ACI-TIPI.
- The selected report is *without interpretation*.
  - Select *Interpretation* for the report.
- The ACI-TIPI required information is not entered.
  - Make sure the age range, gender, and chest pain complaints are entered.
- The patient was entered as pediatric.
  - Make sure you enter an age range less than 16.
- The original ECG was acquired in an electrocardiograph without the ACI-TIPI option.

No BP Readings from External Device

- Check setup.
  - If Suntech, check protocol on Tango.
- Check cables (Serial and TTL).
- Check TTL trigger.

Treadmill / Ergometer Does Not Move

- Check protocol.
- Check cables.
- Check input / output settings.
- Check Emergency Stop switch.

System Errors

The following errors may occur while you are operating this system. You may be required to perform some action.

If you perform the recommended actions and the condition still remains, contact authorized service personnel. See "How to Reach Us" to find out how to contact GE Medical Systems *Information Technologies*.

Problem	Cause	Solution
 appears on the screen.	No battery is installed in the system.	Install a battery and connect the system to an AC wall outlet to charge the battery.
 flashes intermittently.	The battery charge is low.	Connect the system to an AC wall outlet to charge the battery.
 appears on the screen.	The writer door is open.	Close the writer door.
The system does not power up when operating from battery power.	The battery is empty.	Connect the system to an AC wall outlet to charge the battery.
The system shuts down when operating from battery power.	Battery is empty, or the *Automatic Shutdown* feature is enabled.	Connect the system to an AC wall outlet to charge the battery, or power on the system.
"X" Lead disconnected message appears.	Electrode(s) disconnected.	Reconnect the electrode(s).
MODEM ERROR. The remote device is not responding. Would you like to retry?	Modem not connected. (If wireless option, client bridge not connected.)	Connect and retry.
	(Wireless option only) MAC 5000 is not within range of access point.	Relocate MAC 5000 to within range of access point and retry transmission.

153A, 154A, 209A

C Appendix C – Editing Acronyms

For your notes

Resting ECG Acronyms

✓ The statements preceded by "#" do not appear on ECG reports when the *Screening criteria* item is enabled in *System Setup*. To enable or disable *Screening criteria*, see "ECG Acquisition/Analysis" on page 14-17.

	Statement	Acronym
#	Aberant conduction	ABCOND
	Abnormal ECG	AB
	Abnormal left axis deviation	ALAD
#	Abnormal QRS-T angle, consider primary T wave abnormality	QRST
	Abnormal right axis deviation	ARAD
	Abnormal right superior axis deviation	RSAD
	Accelerated	ACCEL
	Acute pericarditis	PCARD
	** ACUTE MI **	ACUMI
	, Age undetermined	AU
	, and consecutive	CSEC
	and	AND
	Anterior infarct	AMI
	Anterior injury pattern	AINJ
	Anterior leads	ANT
	Anterolateral infarct	ALMI
	Anterolateral injury pattern	ALINJ
	Anterolateral leads	ANTLAT
	Anteroseptal infarct	ASMI
	Anteroseptal leads	ANTSEP
	Anteroseptal injury pattern	ASINJ
	Atrial fibrillation	AFIB
	Atrial flutter	FLUT
	(Atrial rate=	ARAT
	Atrial tachycardia	ATAC
	AV sequential or dual chamber electronic pacemaker	AVPCK
	Biatrial enlargement	BAE
	*** Bifascicular block***	BIFB
	Biventricular hypertrophy	BIVH
	Blocked	BLKED
	Borderline ECG	BORDE
	Borderline	BO
#	Cannot rule out	CRO
	Clockwise rotation of the heart, may invalidate criteria for ventricular hypertrophy	CWRT
	Coarse	CRS

	Statement	Acronym
	Counterclockwise rotation of the heart, may invalidate criteria for v. hypertrophy	CCWRT
#	Deep Q wave in lead V6,	QV6
	Demand pacemaker; interpretation is based on intrinsic rhythm.	DPCK
	Dextrocardia	DXTRO
#	Early repolarization	REPOL
	Electronic atrial pacemaker.	APCK
	Electronic ventricular pacemaker	PCK
	Fusion complexes	FUS
	In a pattern of bigeminy	BIGEM
	Incomplete left bundle branch block.	ILBBB
#	Incomplete right bundle branch block	IRBBB
	Increased R/S ratio in V1, consider early transition or posterior infarct	QESPMI
	Idioventricular rhythm	IVR
	Indeterminate axis	INDAX
	Inferior infarct	IMI
	Inferior injury pattern	IINJ
	Inferior leads	INF
	Inferior-posterior infarct	IPMI
	Inferolateral leads	IFLAT

	Statement	Acronym
	Inferolateral injury pattern	ILINJ
	Inferoposterior leads	INFPOS
	Irregular	IRR
	Junctional bradycardia	JUNBRAD
	Junctional rhythm	JUNCTR
#	Junctional ST depression, probably abnormal	JST
#	Junctional ST depression, probably normal	JSTN
	Large	LARG
	Lateral infarct	LMI
	Lateral injury pattern	LINJ
	Lateral leads.	LAT
	Left anterior fascicular block	AFB
	Left atrial bradycardia	LABRAD
	Left atrial enlargement	LAE
	Left atrial rhythm	LAR
	Left atrial tachycardia	LATACH
	Left axis deviation.	LAD3
	Left bundle branch block	LBBB
	Left posterior fascicular block	PFB
	Left ventricular hypertrophy	LVH2
	Leftward axis	LAD

	Statement	Acronym
	** Less than 4 QRS complexes detected, no interpretation possible **	ANLERR3
	Low right atrial bradycardia	RABRAD
	Low right atrial rhythm	RAR
	Low right atrial tachycardia	RATACH
	Low voltage QRS	LOWV
	Marked sinus bradycardia	MSBRAD
	Marked ST abnormality, possible anterior subendocardial injury	ASBINJ
	Marked ST abnormality, possible anterolateral subendocardial injury	MSTDAL
	Marked ST abnormality, possible anteroseptal subendocardial injury	MSTDAS
	Marked ST abnormality, possible inferior subendocardial injury	ISBINJ
	Marked ST abnormality, possible inferolateral subendocardial injury	MSTDIL
	Marked ST abnormality, possible lateral subendocardial injury	LSBINJ
	Marked ST abnormality, possible septal subendocardial injury	SSBINJ
	Marked T wave abnormality, consider anterior ischemia	MAT
	Marked T wave abnormality, consider anterolateral ischemia	MALT
	Marked T wave abnormality, consider inferior ischemia	MIT
	Marked T wave abnormality, consider inferolateral ischemia	MILT
	Marked T wave abnormality, consider lateral ischemia	MLT
#	(masked by fascicular block?)	MAFB
	, maybe secondary to QRS abnormality	SNDQA
	** Memory allocation failure, no ECG interpretation possible **	ANLERR1
#	Minimal voltage criteria for LVH, may be normal variant	QRSV
#	Moderate voltage criteria for LVH, may be normal variant	LVH3
	Moderate	MOD
	Narrow QRS tachycardia	NQTACH
	(No P- waves found)	NOPF
	** No QRS complexes found, no ECG analysis possible **	ANLERR2
	Nonspecific intraventricular block	IVCB
#	Nonspecific intraventricular conduction delay	IVCD
	Nonspecific ST abnormality	NST
	Nonspecific ST and T wave abnormality	NSTT
	Nonspecific T wave abnormality	NT
	Normal ECG	NML
	Normal sinus rhythm	NSR

	Statement	Acronym
#	Northwest axis	NWA
	or	OR
	or digitalis effect	ODIG
	Otherwise normal ECG	ABR
	*** Pediatric ECG anlaysis ***	PEDANL
#	, plus right ventricular enlargement	RVE+
	*** Poor data quality, interpretation may be adversely affected	QCERR
#	Possible	PO
	, possibly acute	AC
	Posterior infarct	POSTMI
	Posterior leads	POS
	premature atrial complexes	PAC
	premature ectopic complexes	PEC
	premature junctional complexes	PJC
	premature supraventricular complexes	PSVC
	premature ventricular and fusion complexes	PVCF
	premature ventricular complexes	PVC
	, probably digitalis effect	PDIG
	Prolonged QT	LNGQT
	Prominent lateral voltage	PLV
#	Prominent mid-precordial voltage,	PMDPV
	Prominent posterior voltage	PPV
#	Pulmonary disease pattern	PULD
	*** QRS contour suggests infarct size is probably	MISIZ
	Right atrial enlargement	RAE
#	Right axis deviation	RAD4
	Right bundle branch block -or-right ventricular hypertrophy	RBBRVH
	Right bundle branch block	RBBB
#	Right superior axis deviation	RAD5
	Right ventricular hypertrophy	RVH
#	Rightward axis	RAD
#	RSR' or QR pattern in V1 suggests right ventricular conduction delay	RSR
#	S1-S2-S3 pattern, consider pulmonary disease, RVH, or normal variant	S1S2S3
	Septal infarct	SMI
	Septal injury pattern	SINJ
	Septal leads	SEP
	Sinus/Atrial capture	CAPUR
	Sinus bradycardia	SBRAD
	Sinus rhythm	SRTH

	Statement	Acronym
	Sinus tachycardia	STACH
	Small	SMA
	ST &	ST&
	ST abnormality and	STABAND
	ST abnormality, possible digitalis effect	STDIG
	ST depression in	STDPIN
	ST depression, consider subendocardial injury or digitalis effect	STDEP
	ST elevation consider anterior injury or acute infarct	AIOHAI
	ST elevation consider anterolateral injury or acute infarct	ALIHAI
	ST elevation consider inferior injury or acute infarct	IIOHAI
	ST elevation consider inferolateral injury or acute infarct	ILIHAI
	ST elevation consider lateral injury or acute infarct.	LIOHAI
	ST elevation in	STELIN
#	ST elevation, consider early repolarization, pericarditis, or injury	SERYR1
#	ST elevation, probably due to early repolarization.	SERYR2
	ST elevation, consider injury or variant associated with LVH	INJONV
	Statement not found	SNF
	Supraventricular tachycardia	SVT

Statement	Acronym
*** Suspect arm lead reversal, interpretation assumes no reversal	ARM
T wave abnormality, consider anterior ischemia	AT
T wave abnormality, consider anterolateral ischemia	ALT
T wave abnormality, consider inferior ischemia	IT
T wave abnormality, consider inferolateral ischemia	ILT
T wave abnormality, consider lateral ischemia	LT
T wave inversion in	TINVIN
Undetermined rhythm	UR
Unusual P axis and short PR, probable junctional bradycardia	JBRAD
Unusual P axis and short PR, probable junctional rhythm.	JR
Unusual P axis and short PR, probable junctional tachycardia	JTACH
Unusual P axis, possible ectopic atrial bradycardia.	EABRAD
Unusual P axis, possible ectopic atrial rhythm	EAR
Unusual P axis, possible ectopic atrial tachycardia	EATACH
Ventricular pre-excitation, WPW pattern type A	WPWA
Ventricular fibrillation	VFIB
Ventricular tachycardia	VTACH
Ventricular pre-excitation, WPW pattern type B	WPWB

	Statement	Acronym
	very large	VLAR
	very small	VSMA
	Voltage criteria for left ventricular hypertrophy	LVH
	with	WITH
	wide QRS rhythm	WQR
	wide QRS tachycardia	WQTACH
	with 1st degree AV block	FAV
#	with 2:1 AV conduction	W2T1
	with 2nd degree AV block (Mobitz I)	MBZI
	with 2nd degree AV block (Mobitz II)	MBZII
	with 2nd degree AV block	SAV
	with 2nd degree SA block (Mobitz I)	SABI
	with 2nd degree SA block (Mobitz II)	SABII
#	with 3:1 AV conduction	W3T1
#	with 4:1 AV conduction	W4T1
#	with 5:1 AV conduction	W5T1
#	with a competing junctional pacemaker	CJP
	with AV dissociation	AVDIS
	with complete heart block	CHB
	with frequent	FREQ
	with fusion or intermittent ventricular pre-excitation (WPW)	ALTWPW
	with junctional escape complexes	JESC
	with marked sinus arrhythmia	MSAR
	with occasional	OCC
	with premature aberantly conducted complexes	ABER
	, with posterior extension	PXT
	with QRS widening and repolarization abnormality	QRSW-2ST
	with QRS widening	QRSW
#	with rapid ventricular response	RVR
#	with retrograde conduction	RETC
	with repolarization abnormality	2ST
	with short PR	SPR
	with sinus arrhythmia	SAR
	with sinus pause	PAUSE
#	with slow ventricular response	SVR
	with strain pattern	WSTR
#	with undetermined rhythm irregularity	IRREG
	with variable AV block	VAVB
	with ventricular escape complexes	VESC
	Wolffe-Parkinson-White	WPW

D Appendix D – Technical Specifications

For your notes

Computerized Electrocardiograph

Item	Description
Instrument Type	14 leadwire microcomputer-augmented, automatic electrocardiograph
Battery Capacity	100 ECG acquisitions and one-page reports or 6 hours continuous operation (without printing)
ECG Storage	150 ECG's (typ), 200 (max) on removable media (1.44 MB, 3.5" diskette)
Acquisition	Simultaneous acquisition of up to 14 leadwires with programmable lead configurations
Analysis	12SL adult and 12SL pediatric analysis. Optional: HI-RES or PHI-RES late Potential Analysis (standard 12 leads plus leads V3R, V4R, V7), ACI-TIPI
Analysis Sampling Rate	500 samples/s (sps)
Digital Sampling Rate	4000 samples/s/channel
Dynamic Range	±320 mV DC, ±10 mV AC
Resolution	4.88 µV/LSB @ 500 sps
Frequency Response	–3 dB @ 0.01 to 150 Hz
Common-Mode Rejection	140 dB minimum (123 dB with AC filter disabled)
Input Impedance	>10 MW, defibrillator protected
Patient Leakage Current	<10 µA
Pacemaker Detection Sensitivity	750 µV amplitude, 50 µs duration, Orthogonal LA, LL and V6
Special Functions	Disconnected and/or shorted lead detection, excessive AC noise, baseline wander, muscle tremor messages, preacquisition, and electrode impedance

Item	Description
Modem (option)	Full duplex Async, FAX
Client Bridge (wireless option)	FCC regulations part 15.247, 15.205, 15.209.
Access Point (wireless option)	Operates license free under FCC Part 15 and complies as a Class B device
Remote MUSE Network Query (option)	Remote retrieval of confirmed ECG records from MUSE Network Series using the Async/CSI modem. Records can be displayed and printed.
RS-232	MAC and MUSE system compatible.
Auxiliary	Peripheral I/O port (magnetic card reader, bar code, etc.)
Infrared	Optional I/O

Electrical

Item	Description
Power Supply	AC or battery operation
Input Voltage	100-240 V ac, +10, -15%, 50/60 Hz, ±10%
Power Consumption 115 V ac 240 V ac	 0.5 A (typ.) 0.3 A (typ.)
Analog Outputs	2 channels 0-10 V 1 channel ±10 V (ECG-OUT)
Analog Input	2 channels, 0-10 V, sampled @ approx. 100 sps
TTL	1 output channel with programmable polarity delay and width

Physical

Item	Description
Table Top Unit Dimensions Height Width Depth	 9.4 cm (3.7 in) display closed/30.5 cm (12 in) display open 38.1 cm (15.0 in) 35.1 cm (13.8 in)
Table Top Unit Weight	6.8 kg (15 lb) without paper
Table Top Unit w/Cart Dimensions Handle Height Width Depth	 88.9 cm (35 in) 41.9 cm (16.5 in) 66 cm (26 in)
Table Top Unit w/Cart Weight	20.4 kg (45 lb)

Safety

Item	Description
Certification	UL 2601-1 classified UL classified for CAN/CSA C22.2 No. 601.1 CB certified for IEC 601-1 CE marking for Council Directive 93/42/EEC concerning Medical Devices Meets applicable AAMI EC-11 requirements
Type of protection against electrical shock	Class 1, internally powered
Degree of protection against ingress of liquids	Ordinary
Handling of disposable supplies and other consumables	Use only parts and accessories manufactured or recommended by GE Medical Systems *Information Technologies*. Follow manufacturer's instructions for use for disposable/consumable products. Follow local environmental guidelines concerning the disposal of hazardous materials.
Mode of Operation	Continuous
Patient Leakage Current	<10 µA
Degree of protection against electric shock	Type BF defibrillation protection for the patient cable (acquisition module)

Item	Description
Maintenance Frequency	Daily visual inspection and routine cleaning (if needed) performed by user. Use a commercially available, industrial strength disinfectant cleaner on any part of the equipment (other than electrodes) which comes into direct contact with the patient. Every six months routine maintenance checks and test procedures performed by qualified technical personnel (See the field service manual for details.)
Repair Guidelines	Calibration instructions, equipment descriptions, and all other information which will assist qualified technical personnel in repairing those parts of the equipment designated as repairable is available in the field service manual for the equipment. GE Medical Systems *Information Technologies* will make available upon request circuit diagrams and component parts lists for printed circuit boards deemed repairable by qualified technical personnel.

Environmental

Item	Description
Operating Conditions Temperature Relative Humidity Atmosphere Pressure	 10°C to 40°C (50°F to 104°F)* 20% to 95% noncondensing 700 to 1060 hPa
Storage Conditions Temperature Relative Humidity Atmosphere Pressure	 -40°C to 70°C (-40°F to 158°F)* 15% to 95% noncondensing 500 to 1060 hPa
Disposal Batteries Device	 Disposing of battery by fire or burning will cause the battery to explode. The battery is recycleable. Follow local environmental guidelines concerning disposal and recycling. Batteries may be returned to GE Medical Systems *Information Technologies* for recycling. Recycleable.
Video Output	Standard VGA

Battery

Item	Description
Type	User replaceable, 18 V rechargeable NiMH pack
Capacity	3.5 AH ±15%
Charge	5.0 hours (4.5 hours typical) (with display off) ✓ Cannot charge battery at or above 45°C (best if below 40°C)

Writer

Item	Description
Type	Thermal dot array (horizontal 1000 dots/in at 25 mm/s; vertical 200 dots/in)
Frequency Response	0.01 to 150 Hz
Number of Traces	3, 6, 12, 15 user-selectable and programmable (same as display)
Paper Speeds	5, 12.5, 25, 50 mm/s DC drive
Sensitivity/Gain	2.5, 5, 10, 20, and 10/5 (split calibration) mm/mV
Speed/Sensitivity Accuracy	± 2%
Sensitivity (Gain) Accuracy	± 5%
Paper Type	Thermal, perforated, 214.63 mm x 280 mm (8.45 in x 11 in), z-fold, 300 sheets per pack (European 210 mm x 297.5 mm (8.27 in x 11.7 in) A4 style paper available)

Vectorcardiography

Item	Description
Vector Plot Formats	Vector loops of component vectors (P, QRS, ST-T)
Sensitivities	20, 40, 80, 160 mm/mV
Time Resolution	2 ms

Pediatric Analysis

Item	Description
Acquisition	Simultaneous 15-lead acquisition. (Standard 12 lead plus pediatric leads V3R, V4R and V7.)

Late Potential Analysis

(Hi-Res and PHi-Res Signal Averaged Electrocardiography)

Item	Description
Frequency Response/Input	-3 dB @ 0.01 and 250 Hz
Frequency Response/ Output Upper Limit Lower Limit	 250 Hz 0.01, 25, 40 or 80 Hz
Sensitivities Raw Data and Template Average Beat Filtered Signals and Vector Magnitude	 20 mm/mV 20 mm/mV and 50 mm/mV 1 mm/µV
Analysis Sampling Rate	1000 samples per second per channel
Digital Sampling Rate	4000 samples per second per channel
High/Low Pass Filters	Spectral filter using Fast Fourier Transform (FFT)
ADC Resolution	1.22 µV/LSB
Analysis Resolution	0.1525 µV/LSB

E Appendix E – Report Formats

For your notes

Format Description

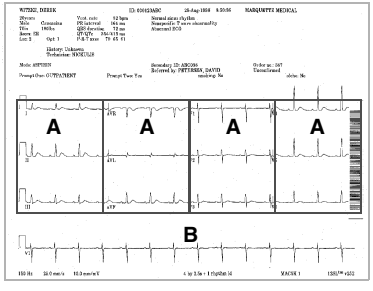
Numeric report names are used to describe how the ECG data is displayed.

4 by 2.5s + 1 rhythm ld

A B

4 by 2.5s + 1 Rhythm Lead Format

	Description
A	Four columns of data containing 3 leads with 2.5 seconds of data in each lead.
B	One 10 second rhythm lead.



147A

The following reports also use numeric names:

- 2 by 5
- 2. 5s @ 50 mm/s (writer speed)
- 2 by 5s + 1 rhythm lead
- 2 by 10s
- 3 by 5 @ 50mm/s
- 3 by 10s
- 4 by 2.5s
- 4 by 2.5s + 1 rhythm lead
- 4 by 2.5s + 3 rhythm leads
- 4 by 10s
- 5 by 2s
- 5 by 2s + 1 rhythm lead
- 5 by 2s + 3 rhythm leads
- 5 by 10s

Key to Bottom of Exercise Reports

The following report codes are printed on the lower left edge of the Exercise Report and have the following meaning:

A+	Auto Arrythmia Reporting is ON.
A-	Auto Arrythmia Reporting is OFF.
H+	Stag Hold is ON.
H-	Stag Hold is OFF.
S+	Cubic Spline is ON.
S-	Cubic Spline is OFF.
50	50Hz AC filter is ON.
60	60Hz AC filter is OFF.
HR	Binary encoded format for heart rate leads.

Additional Report Names

Report Name	Description
12 Rhythm Leads	10 seconds of 12-lead rhythm.
Autorhythm	10 seconds of 3, 6, or 12 leads of rhythm.
CGR	One median complex for each of the 12 leads combined with 10 seconds of 3-lead rhythm.
Expanded Median	Each median complex can be expanded by double the speed and double the gain.
Linked Median	A 4 x 2.5 with 1 rhythm lead format. Each lead begins with a median waveform and is followed by real-time data. The rhythm lead printed across the bottom of the report is the first lead of the 'Swedish format rhythm leads' group that is configured in Exercise Setups (Report Leads).
Medians and Rhythm	A median complex for each of the standard 12 leads is displayed in the upper portion of this report. Below the medians are three rhythm strips. These rhythm leads are the first three leads of the 'Swedish format rhythm leads' group that is configured in Exercise Setups (Report Leads).
6 Lead Comparative Medians and Rhythm	The baseline and current medians are compared side-by-side and followed by real-time waveforms. The 6 leads used by this report are the 'Swedish format rhythm leads' group that is configured in Exercise Setups (Report Leads).
12 Lead Comparative Medians and Rhythm	A one-page report for which the baseline and current medians are compared side-by-side and followed by 2.5 seconds of real-time rhythm for the standard 12 leads. ST level and ST slope are reported for each lead.
Hi-Res or PHi-Res Signal Averaged Template	Dominant (averaged) beat type.
Hi-Res or PHi-Res Signal Averaged Standard	Vector magnitudes of X,Y,Z.
Hi-Res or PHi-Res Signal Averaged Expanded	400mm/s of expanded X,Y,Z medians and a RMS voltage function/VM plot.
ACI-TIPI	The analysis of the acquired ECG data appears at the top of the report.

Report Name	Description
Hi-Res or PHi-Res Signal Overlapped	X,Y,Z data at two different amplitudes.
RMR	One median complex for each of the 12 leads combined with 10 seconds of 3-lead rhythm.
Swedish Format 1	One median complex for each of the 12 leads at writer speed of 50mm/s combined with 5 seconds of 6-lead rhythm at half writer speed. Text is on the bottom of the page.
Swedish Format 2	5 seconds for each of the 12 leads at writer speed 50mm/s. Text is on the top of the page.
Vector Loops	Sagittal, horizontal, and frontal plane vectorgrams. Marks on sample X,Y,Z complexes identify P onset and offset, Q onset and offset, and T onset.

In-Test Reports

Report Name	Description
12 or 15-Lead Report	Based on Exercise report setups, a variety of 12 or 15 Lead report formats will print without ECG analysis when the **12 ld** key is pressed or when 12/15 lead reports are configured in the protocol.
5 Second Rhythm Report	This report can be chosen from the Edit Protocol application to print at certain points during the test.
Rhythm Report	A continuous, real-time recording of raw data - 3, 6, 12 leads. Leads for rhythm report correspond to leads on the screen.
Arrhythmia Report	Automatic documentation of arrhythmias with 2.5 seconds of raw data prior to the ectopic beat. Leads of arrhythmia report correspond to leads on the screen.
Recall Report	A delayed recording of raw data 10 seconds in duration. Leads of recall report correspond to leads on the screen.
Median Report	Based on exercise setups, a Linked Median, Medians & Rhythms, 6 or 12 Lead Comparative Medians & Rhythm report will print. See the 'Additional Report Names' section for a description of these formats.

Exercise Final Report Names

Report Name	Description
Summary Report	One page overview of test with Resting and Max ST or peak median morphologies. For Maximal ST Depression, report only prints when a minimum of -.5 mm of ST depression occurs in one of the following leads. I, II, III, aVF, V2-V6. (V1, aVR, aVL excluded. For elevation, - aVR is excluded).
Tabular Report	Tabular summary of test by stage including time, speed, grade, workload, MET level, heart rate, blood pressure, RPP and comments.
Selected Medians Report	Records median morphologies at Baseline, Maximum ST Depression, Peak Exercise and Test End for 12 leads. For Maximum ST medians, column only prints when a minimum of -.5 mm of ST depression occurs in one of the following leads. I, II, III, aVF, V2-V6. (V1, aVR, aVL excluded. For elevation, - aVR is excluded).
Trends and Medians	Records a plot of the heart rate and blood pressure against time. Next to these trend graphs are channels of stored median data from the various stages of an exercise test.
Median Report	Records median morphologies for 3, 6 or 12 leads. The 3 and 6 lead reports are configured using the 'Swedish format rhythm leads' of the Exercise Setups (Report Leads). The 12 lead report uses the standard 12 lead set. The median storage intervals (also referred to as sample cardiac cycles) can be configured using the Median (First and Repeat) column of the Protocol Editor.
Trend Reports	Records plots of PVCs, heart rate and blood pressure. Also produces trend report of ST level and slope vs. time. The 3-lead trend report will use the first three leads of the 'Swedish format rhythm leads'.
ST/HR Loops Report	A two-dimensional representation of ST Level vs. Heart Rate.
ST/HR Slope Report	Records linear regression of heart rate-adjusted slope for all leads, plus median morphology of lead with highest slope.

F Appendix F – Master's Step Data

For your notes

Master's Step Table

As shown in the table below, the number of steps is set according to the age, sex, and weight settings for the patient as they reside or are entered into the system.

Age		5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79
Weight (kg)	**Sex**															
18-22	**Male**	35	36													
	Female	35	35	33												
23-26	**Male**	33	35	32												
	Female	33	33	32												
27-31	**Male**	31	33	31												
	Female	31	32	30												
32-35	**Male**	28	32	30												
	Female	28	30	29												
36-40	**Male**	26	30	29	29	29	28	27	27	26	25	25	24	23	23	22
	Female	26	28	28	28	28	27	26	24	23	22	21	21	20	19	18
41-44	**Male**	24	29	28	28	28	27	27	26	25	24	23	22	22	21	20
	Female	24	27	26	27	26	25	24	23	22	21	20	19	18	18	17
45-49	**Male**	22	27	27	28	28	27	26	25	25	24	23	22	22	21	20
	Female	22	25	25	26	26	25	24	23	22	21	20	19	18	18	17
50-53	**Male**	20	26	26	27	27	26	25	25	24	23	22	22	21	21	20
	Female	20	23	23	25	25	24	23	22	21	20	19	18	18	17	16
54-58	**Male**	18	24	25	26	27	26	25	24	23	22	22	21	21	20	19
	Female	18	22	22	24	24	23	22	21	20	19	18	18	17	16	15

Appendix F – Master's Step Data: Master's Step Table

Age		5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79
Weight (kg)	**Sex**															
59-63	**Male**	16	23	24	25	26	25	24	23	23	22	21	20	20	19	18
	Female	16	20	20	23	23	22	21	20	19	19	18	17	16	15	15
64-67	**Male**		21	23	24	25	24	24	23	22	21	20	20	19	18	18
	Female		18	19	22	22	21	20	19	19	18	17	16	15	15	14
68-72	**Male**		20	22	24	25	24	23	22	21	20	20	19	18	18	17
	Female		17	17	21	20	20	19	19	18	17	16	16	15	14	13
73-76	**Male**		18	21	23	24	23	22	22	21	20	19	18	18	17	17
	Female		15	16	20	19	19	18	18	17	16	16	15	14	13	12
77-81	**Male**			20	22	23	23	22	21	20	19	18	18	17	17	16
	Female		13	14	19	18	18	17	17	16	16	15	14	13	13	12
82-85	**Male**			19	21	23	22	21	20	19	19	18	17	16	16	15
	Female			13	18	17	17	17	16	16	15	14	14	13	12	11
86-90	**Male**			18	20	22	21	21	20	19	18	17	16	15	15	14
	Female			12	17	16	16	16	15	15	14	13	13	12	12	11
91-94	**Male**				19	21	21	20	19	18	17	16	16	15	14	14
	Female				16	15	15	15	14	14	13	13	12	11	11	10
94-99	**Male**				18	21	20	19	18	17	17	16	15	14	14	13
	Female				15	14	14	14	13	13	13	12	11	11	11	10
100-104	**Male**				17	20	20	19	18	17	16	15	14	13	13	12
	Female				14	13	13	13	13	12	12	11	11	10	10	09

ST-T Change

The existence of any ST-T change is assessed by classifying ST-T into three assessment levels: positive, borderline, and negative. The following criteria is used:

Positive

- ST depression ≥ 0.1mV (2 or more leads).
- ST elevation ≥ 0.2mV (2 or more leads).
- T wave change ≥ 1.0mV (2 or more leads).
  - No. 1, 2, or 3 is satisfied.

Borderline

- ST depression ≥ 0.05mV (any leads).
- ST elevation ≥ 0.1mV (any leads).
- T wave change ≥ 0.5mV (any leads).
  - No. 1, 2, or 3 is satisfied.

Negative

- Positive and borderline criteria are NOT satisfied.

Calculation

ST depression = (rest ST - post J) - (post exercise ST - post J)

ST elevation = (post exercise ST - post J) - (rest ST - post J)

T wave change = absolute value of (rest T wave amplitude - post-exercise T wave amplitude)

(ST - post J: amplitude at the post J point)

When the assessment is positive or borderline, the lead with the largest change prints.

For your notes

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For your notes

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