4

Performance Verification, Diagnostic, and Safety Tests

This chapter describes the tests and inspections required to verify performance of the PageWriter TC cardiograph following a service event, as well as how to perform diagnostic tests.

This chapter provides the following information:

Required Testing Levels

The Performance Verification Tests verify proper operation of the PageWriter TC cardiograph following a service event. The level of testing required corresponds to the type of service performed.

N O T E   Installation and preventive maintenance are not considered service events since the cardiograph is designed to be installed and maintained by the user. Service Events are divided into two categories: *repairs* and *upgrades*. Repairs are then further divided into *external repairs* and *internal repairs*.

External Repairs

External repairs consist of repairs or replacements of one or more items. Repair or replacement of these items does not require you to open the cardiograph case, therefore only a limited number of tests are necessary to verify performance post-repair. External repairs that involve the PIM, PIM data cable, and PIM lead set require an ECG simulation test to verify proper ECG signal path.

Typical external repairs include:

- PIM
- Patient Leads
- PIM data cable
- Labels
- Batteries
- Paper Tray
- AC Power Cord
- AC Power Supply
- Wireless LAN card
- USB external devices
- Barcode reader
- Trolley
- External cables

Refer to Table 4-1 on page 4-3 for the required test blocks that must be performed after any external repair occurs.

Internal Repairs

If the case was opened, regardless of the repair, you must perform additional Performance Verification tests. Refer to Table 4-1 on page 4-3 for the required test blocks that must be performed after any internal repair.

Upgrades

NOTE   There are no software upgrades available for the PageWriter TC70 cardiograph.

Most TC50, TC30, and TC20 cardiograph upgrades are installed by the user, and are not considered service events. The only exceptions are upgrades for the software and the magnetic card reader. Refer to Table 4-1 for the required test blocks that must performed after these upgrades.

Table 4-1   Tests required after performing repairs and upgrades

Service Event		Test Blocks Required
Repairs	External Repairs not involving the patient module (battery, AC power supply, labels, or cart)	1 Visual Inspection 2 Power On test 3 Functional tests specific to components repaired
Repairs	External repairs where the cardiograph case is not opened, but involving the patient module, patient lead set, or patient data cable	1 Visual Inspection 2 Power On test 3 ECG simulation test 4 Functional tests specific to components repaired
	Internal repairs where the cardiograph case is opened	1 Perform Visual Inspection 2 Power On test 3 ECG simulation 4 Safety tests S2, and S3, plus functional tests specific to components repaired
Upgrades	Software Upgrades (via USB memory stick) TC50/TC30/TC20 only	Power On test

Using the Service Utilities

The Service Utilities enable you to:

- Obtain information about the cardiograph, such as software versions, installed options, networking information, and battery status

- Verify and optimize cardiograph performance using the diagnostic tests and utilities

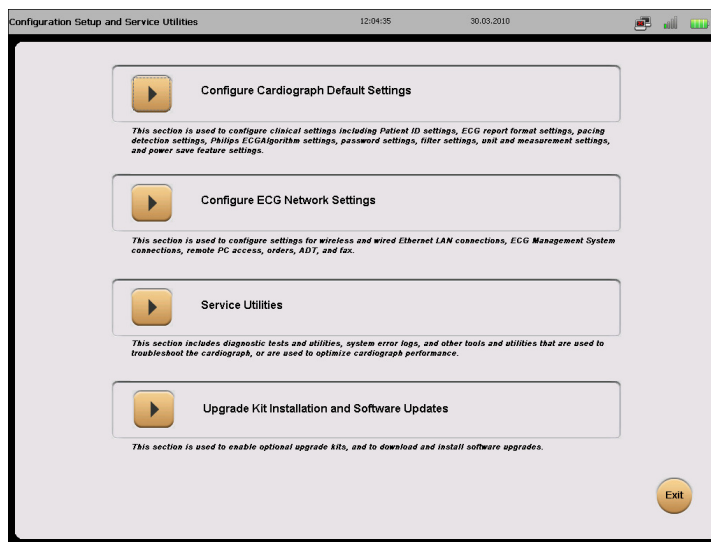**To open the Service Utilities:**

1 From the Main screen, touch **Setup**.

The Setup and Services main screen appears.

NOTE　　　Access to the Setup screens may require entering a password.

2 Touch the button next to **Service Utilities**.

The Setup and Service Utilities screen appears.

Using the About the Cardiograph Screen

The About the Cardiograph screen in the Service Utility provides important information about the cardiograph that can help in the troubleshooting process. This screen provides information on:

- Software revision levels: including application, kernel, and PIM software

- PIM option installed: 12-lead or 16-lead (TC70/TC50/TC30)

- Networking information, such as MAC and IP address

■ Storage information, such as total RAM, percentage of RAM used, Compact Flash and USB memory stick usage

■ Battery status, such as capacity, voltage, temperature, percent charged, and cycle count

■ Voltage monitor information, such as AC/DC input, backlight, and PIM power

■ Installed options

■ Total pages printed

To access the About the Cardiograph screen:

▶ From the Setup and Service Utilities screen, touch the **About the Cardiograph** tab.

To update the information:

▶ Touch **Refresh** to get the latest information.

To print the screen:

▶ Touch **Print** to print a report of the information displayed on the screen. See Figure 4-12 on page 4-6.

Figure 4-12   Service Diagnostics printed report

Philips Medical System
PageWriter TC -- Service Diagnostics

SOFTWARE REVISIONS

Main Application Revision: A.04.01.02
Kernel Revision: 3.16.16100
Application Revision: 3.16.16200
PIM Revision: T.012
FPGA Firmware Revision: 1.6.4

STORAGE INFORMATION

Total RAM: 218 MB
Percentage Total RAM Used: 29%
Internal CF Card(Free/Total): 860.0 / 999.6 MB
USB Memory Stick(Free/Total): 884.0 / 1012.5 MB

Installed Options

D01: All Orders Support Option
D03: Philips ECG Interpretative Algorithm Option
D05: Full Disclosure
D06: ECG Archive Storage Option
D07: Manual Order Option
D12: Last ECG Interactive Query Option
D21/D22: Wireless LAN 802.11 Option

PIM INFORMATION

Installed PIM Option: Triton 12-lead A

NETWORK INFORMATION

MAC Address: 00-09-5C-01-C3-3A
IP Address: 172.28.101.211

VOLTAGE MONITOR INFORMATION

AC/DC Input: 14.386 v
Backlight: 11.887 v
I/O: 3.278 v / 5.149 v

PIM Power: 5.126 v
CPU Internal Core: 1.503 v
Flash Memory Internal Core: 1.796 v
FPGA Internal Core: 1.474 v

PRINTER INFORMATION

Total Number of Printed Pages: 42408

BATTERY STATUS

BAT #1 (Front)
Current Status: <No Bat>
Battery Voltage:
Expected Max Error(%):
Full Capacity(mAh):
Remaining Capacity(mAh):
Percent Charged:
Charge Current:
Discharge Current:
Cycle Count:
Temperature:
B1 Unique ID:

BAT #2 (Back)
Current Status: No activity
Battery Voltage: 12.3 V
Expected Max Error(%): 3%
Full Capacity(mAh): 6911 mAh
Remaining Capacity(mAh): 6721 mAh
Percent Charged: 97%
Charge Current: 0 mA
Discharge Current: 0 mA
Cycle Count: 16
Temperature: 24
B2 Unique ID: KONEMOLI-MO13RJ-200B0424-1432

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Using the Diagnostic Tests and Utilities Tab

The diagnostic tests and utilities help you to troubleshoot issues with the cardiograph. The cardiograph offers two level of tests.

- Maintenance Tests – used to verify or to optimize cardiograph performance. These tests can be used as the first step in identifying a technical problem with the cardiograph. For information on accessing these tests, see page 4-8.

- Diagnostic Tests – used to identify and to troubleshoot a technical problem with the cardiograph and require a password to access.

All test results are entered in the Event log that is displayed on the screen. Additionally, you can save all log files to a USB memory stick. For details, see "Viewing and Saving Log Files" on page 3-39.

To access the diagnostic utilities:

1   From the Main screen, touch **Setup**.

2   Touch **Service Utilities**.

**3**   Touch **Diagnostic and Test Utilities**.
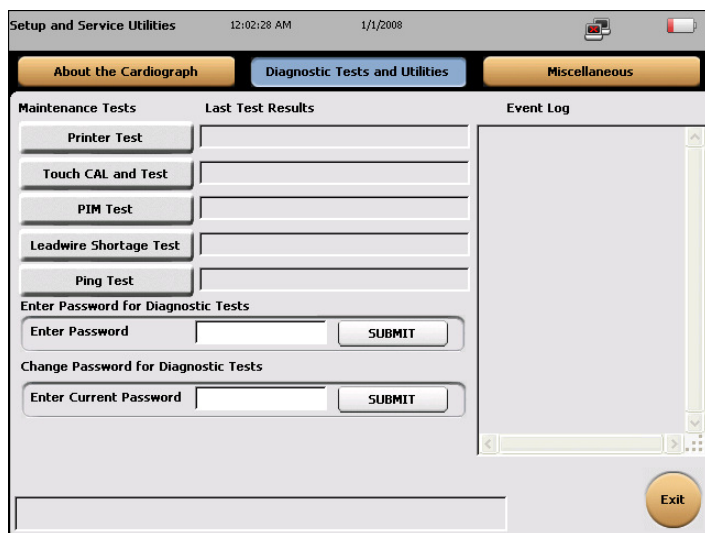
An additional set of tests is controlled by password. For details, see "Password-Controlled Diagnostic Tests" on page 4-22.

Note that some of the tests are also available through the Maintenance tab in the Default Cardiograph Settings window.

To access the maintenance tests:

1   From the Main screen, touch **Setup**.

2   Touch **Configure Cardiograph Default Settings**.

3   Touch **Maintenance Tests**.
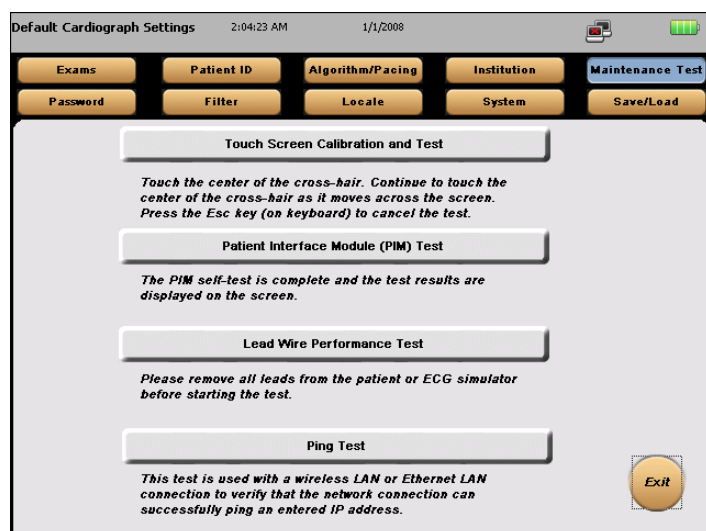
For details about performing these tests, see "Individual Functional Tests" on page 4-11.

Test and Inspection Matrix

The following Test and Inspection Matrix describes the various test blocks, expected test results, and what you need to document on the service record.

Table 4-2   Test and Inspection Matrix

Test Block Name	Test or Inspection to Perform	Expected (Passing) Test Results	What to Record on a Service Record
Visual Inspection (V)	Perform visual inspection (page 4-10).	If there is no apparent wear, damage, or corrosion the visual inspection passes.	V:P (pass) V:F (fail)
Power On (PO)	■ Power on the unit (page 4-11). ■ Watch display for errors. ■ See the Troubleshooting chapter for a list of errors.	If the display shows the Software Identification screen followed by the Main screen, the Power On test passes.	PO:P (pass) PO:F (fail)

Table 4-2   **Test and Inspection Matrix** *(continued)*

Test Block Name	Test or Inspection to Perform	Expected (Passing) Test Results	What to Record on a Service Record
Individual Functional Tests			
Printer, Touch Screen, PIM, and Keyboard tests can be run from within the Service Utilities			
Printer Test (P)	Perform Printer Test (page 4-12).	As described in the test procedure.	P:P (pass) P:F (fail)
Touch Screen Test (TD)	Perform the Touch Screen Display and Calibration tests (page 4-14).	As described in the test procedure.	TD:P (pass) TD:F (fail)
PIM Test (PIM) TC70/TC50/TC30 only.	Perform the PIM test (page 4-16).	As described in the test procedure.	PIM:P (pass) PIM:F (fail)
Keyboard Test (K)	Perform the Keyboard test (page 4-24).	As described in the test procedure.	K:P (pass) K:F (fail
Leadwire Test (LW)	Test the lead wires for both open and shorts (page 4-17).	As described in the test procedure.	LW:P (pass) LW:F (fail)
ECG Simulation (ECG)	Connect a 12 Lead Patient Simulator to the lead set and print a 12 lead ECG. Visually analyze the printout (page 4-18).	If there is trace activity in all leads with no notable distortion or noise, and cal pulses of proper duration and amplitude, then the ECG Simulation passes.	ECG:P (pass) ECG:F (fail)
Safety (S1) TC50/TC30/TC20 only	Earth Resistance Test (page 4-21).	Test limits: 200 mOhm using a reduced 200 mA test current	Example: S1:P/100 mOhm
Safety (S2)	Equipment leakage current (page 4-21).	SF Maximum leakage current $\leq$ 1000 uA	Example: S2:P/999
Safety (S3)	Leads leakage current (page 4-22). ■ Source (Normal condition) ■ With Mains on applied part (Single Fault Condition)	 $\leq$ 10 uA x1 $\leq$ 50 uA x3	Example: S3:P/5/20

Test Equipment

The following test equipment is required to perform the complete set of Performance Verification tests:

- ECG Simulator

- Electrical Safety Tester

- USB memory stick with the most recent PageWriter TC software

Performance Verification Tests

The tests listed in Table 4-2 on page 4-8 are described in the following sections.

Visual Inspection (V)

Before beginning the inspection, press the On/Standby button (⏻) for 2 to 3 seconds to put the cardiograph in Standby mode and unplug the power cord from the wall outlet.

Inspect the cardiograph external surfaces for the following:

■ Worn or damaged power cord	■ Loose or missing hardware
■ Mechanical damage	■ Evidence of liquid spill
■ Worn printer drive gear	■ Torn printer roller
■ Corroded or damaged reusable electrodes, if present	■ Damaged patient leads
■ Dirt/paper residue on the thermal print head	■ Frayed or damaged wiring
■ Visible touch screen damage	

Be sure to:

- Replace any damaged or missing items

- Clean the patient data cable and patient leads. See "Cardiograph and PIM/Patient Cable Cleaning" on page 2-3 and "Patient Cable and Lead Wire Cleaning" on page 2-4.

Power On Test (PO)

Restart the cardiograph to process a completed Power On test.

To restart the cardiograph:

1   Press the **On/Standby** button (⏻) for 2-3 seconds to shut down the cardiograph.

2   Press the **On/Standby** button again to power on the cardiograph.

After approximately 20 seconds, the PageWriter TC cardiograph software identification screen appears, followed by an audible beep.

The following self-tests are automatically performed during reboot:

■   Software CRC Test

■   Flash Memory: onboard CompactFlash (CF) and internal CompactFlash (CF)

■   PIM Status

■   USB Detect

Individual Functional Tests

You perform the Printer, Touch Screen, PIM, and Keyboard tests using the Service Utilities, Diagnostic Tests and Utilities screen.

You can now access the individual tests, as follows:

■   "Printer Test (P)" on page 4-12

■   "Touch Screen Display and Calibration Test (TD)" on page 4-14

■   "Patient Interface Module (PIM) Test" on page 4-16

■   "Ping Test" on page 4-18

■   "Keyboard/Hardware Key Test (K)" on page 4-24

Printer Test (P)

The Printer Test is used to verify that the cardiograph printer is able to correctly print the test page. Use this test to verify proper printer performance or when reports appear to have print quality errors.

To perform the Printer test:

1   Touch **Printer Test** on the Diagnostic and Test Utilities screen (page 4-7).

     The message **Printing Test Page...** appears and the test page prints out.

2   Review the printer test page at points A, B, C, and D as shown on Figure 4-13 on page 4-13.

Test Point	Description
A	The stepped bars are sharp edged and printed cleanly without distortion or missing segments
B	The spacing between the vertical lines is 25 mm with a discrepancy of no more or less than 2%
C	The diagonal lines should be straight and printed cleanly without distortion or breaks in the lines
D	The character set is printed cleanly without distortion or missing characters, and all characters are clearly legible

If the printer test page matches the printer test points as described in the previous table and the message Printer Test Passed appears, the cardiograph has passed the printer test.

If the printer test page does not match the printer test points as described in the previous table but the message Printer Test Passed appears, it is possible the print head is damaged.

If the printer test page does not match the printer test points and the message Printer Test Failed appears, the cardiograph has failed the print test. Proceed with troubleshooting (Chapter 3, "Troubleshooting") and possibly replacing the print head assembly. Contact the Philips Response Center for further assistance (page 5-17).

Figure 4-13   Printer Test Page
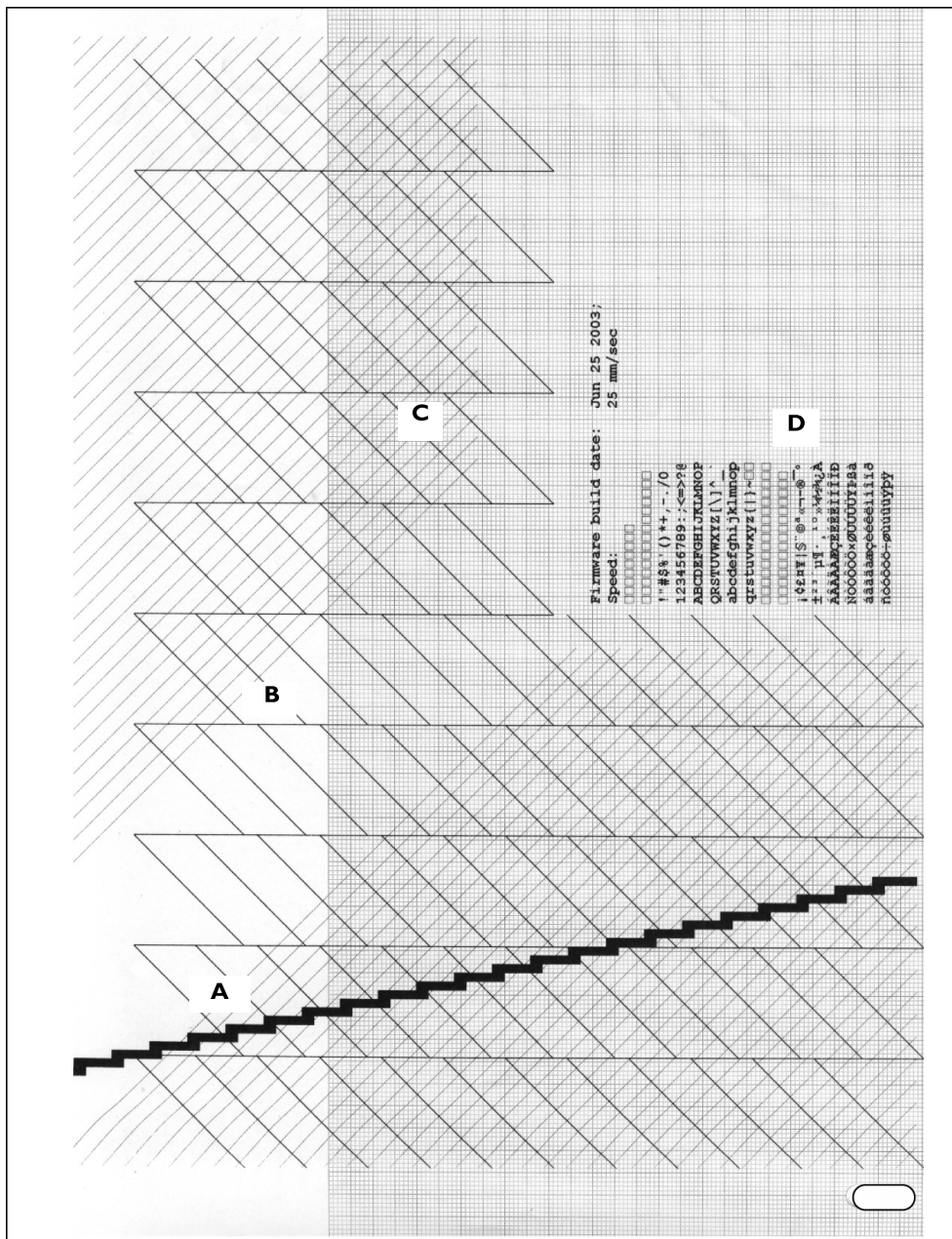
Touch Screen Display and Calibration Test (TD)

The touch screen can be calibrated at any time. Calibration is recommended if it requires many attempts to select an item on the screen, or if selecting items on a specific area of the screen is difficult.

The touch screen may also require calibration if the cardiograph is used in different settings (seated instead of standing) or by users of significantly different height. The touch screen may need to be recalibrated to work optimally in the new setting or with the new user. The Touch Screen Calibration procedures and tests include:

■   Force Calibration procedure

■   Touch Calibration test

To calibrate the touch screen using Force Calibration:

1   Touch the **Touch CAL and Test** button on the Diagnostic and Test Utilities screen (page 4-7), then touch **Force Calibration**.

As an alternative, press **Ctrl** + **Alt** + **C**.

Or, touch **Setup > Configure Cardiograph Default Settings > Maintenance Test**; then touch **Touch Screen Calibration and Test** on the Maintenance Test screen or

A white screen appears with a cross hair (center of screen).

2   Touch the middle of the cross hair where the two lines intersect. When the cross hair is touched it moves to a new location.

3   Continue to touch the center of the cross hair as it appears in new locations on the screen.

4   When the test is finished, press Enter to accept the new settings or Esc to revert to the previous calibration.

To calibrate the touch screen with the Touch Calibration test:

1   Touch the **Touch CAL and Test** button on the Diagnostic and Test Utilities screen (page 4-7).
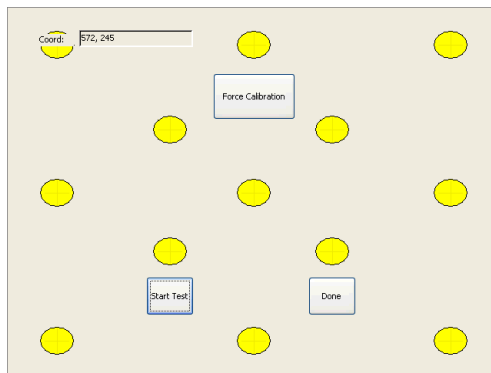
The Calibration screen appears.
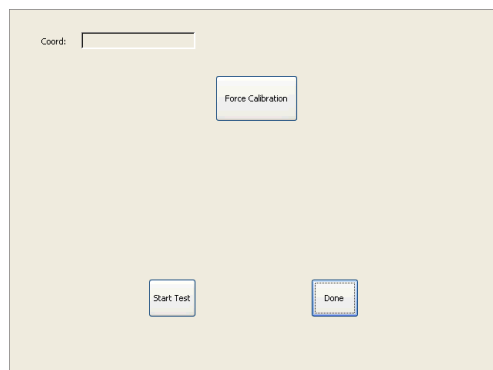
2   Touch **Start Test**. The calibration screen appears with a group of blue targets.
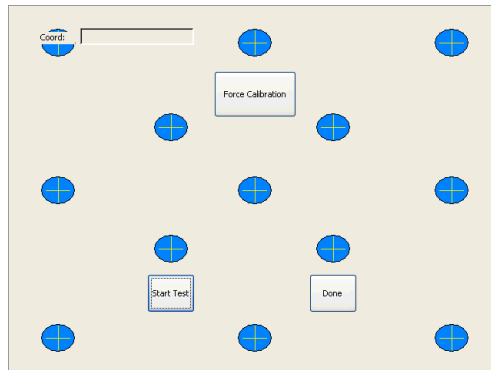
3   Touch the center of each blue target. When you touch the circle correctly, it turns yellow.

When all targets are yellow, the test is complete.

4   Touch **Done** to exit the screen.

Patient Interface Module (PIM) Test

NOTE   The TC20 cardiograph does not use the PIM; it uses the patient cable. This test does not apply.

This test is used to confirm that the Patient Interface Module (PIM) is communicating with the TC70, TC50, or TC30 cardiograph. This test can be performed when the cardiograph displays PIM error messages, or when the cardiograph is unable to acquire data from the PIM. Be sure that the PIM patient data cable is securely attached to the PIM connector on the rear of the cardiograph before performing the test.

If this test fails, it may indicate a problem with the PIM or with the PIM patient data cable.

To perform the PIM Test:

1   Ensure that the patient data cable is securely attached to the PIM connector ( ) on the rear of the cardiograph. Ensure that the PIM disconnected icon ( ) does not appear on the Status Bar.

2   Touch **PIM Test** on the Diagnostic and Test Utilities screen (page 4-7).

As an alternative, touch **Setup > Configure Cardiograph Default Settings > Maintenance Test**; then touch **PIM Test** on the Maintenance Test screen.

The PIM test automatically starts; the results appear on the screen.

The Patient Interface Module (PIM) Test window reports the PIM option, the currently installed software PIM Kernel version, and whether the PIM test has failed or passed.

– If the message, *PIM Test Passed,* appears, the PIM is communicating properly with the cardiograph.

– If the message, *PIM Test Failed,* appears, check that the PIM patient data cable is securely attached to the PIM connector on the rear of the cardiograph, and repeat the test. If the error message persists, contact the Philips Response Center for assistance.

3   Touch **Close** to close the window.

Leadwire Test (LW)

The Leadwire Test should be run on a weekly basis. This test examines all of the lead wires for shortages and reports the results. Lead wire shortages can often be subtle and appear as intermittent ECG signal loss, signal noise, or reduced signal amplitude. Any lead that is reported as having a shortage must be replaced.

NOTE   The Leadwire test requires software version A.03 or later and PIM firmware version T.012 or later. If the LW test fails with *Unknown Error [1]*, the most likely reason is that the PIM firmware is not at version T.012 or later. In this case, upgrade the firmware and rerun the test.

For the TC70/TC50/TC30, start at step **1**.

For the TC20, start at step **2**.

To perform the Lead wire test:

1   Ensure that the patient data cable is securely attached to the PIM connector ( ) on the rear of the cardiograph. Ensure that the PIM disconnected icon ( ) does not appear on the Status Bar (top of screen).

2   Ensure that all leads are securely attached to the lead connectors on the PIM.

3   Disconnect the leads from a patient or patient simulator before starting the test

4   Touch **Leadwire Shortage Test** on the Diagnostic and Test Utilities screen (page 4-7).

As an alternative, touch **Setup > Configure Cardiograph Default Settings > Maintenance Test**; then touch **Lead Wire Performance Test** on the Maintenance Test screen.

The Leadwire Test window appears with the message **Checking Leadwires...** At the conclusion of the test, any lead wire shortages are identified on the same window.

5   Replace any leads that are identified as having a lead wire shortage.

6   Touch **Close**.

Ping Test

The Ping Test is used with a wireless or wired network connection to verify that the cardiograph can successfully communicate over a network connection to an entered IP address.

To perform the Ping test:

1   Ensure that the LAN cable is securely attached to the LAN connector (⊟⊟) on the rear of the cardiograph, or that the wireless LAN connection is associated to an access point and that green bars appear on the Status Bar (top of screen), indicating a live wireless connection.

2   Touch **Ping Test** on the Diagnostic and Test Utilities screen (page 4-7).

   As an alternative, touch **Setup > Configure Cardiograph Default Settings > Maintenance Test**; then touch **Ping Test** on the Maintenance Test screen.

   The Ping test window appears.

3   Type the IP address to check, and touch **Ping**.

The Ping Test results window appears and reports the test results.

ECG Simulation (ECG)

Taking an ECG using a 12-lead ECG simulator allows you to verify areas of operation that the extended self-test cannot check:

■   Integrity of the patient leads

■   Accuracy of the paper speed (not available on all simulators)

■   Accuracy of the gain settings (not available on all simulators)

The recorded ECG trace should look similar to the one shown in the following figure. Trace differences may result from differences in simulators, simulators settings, and from differences in configuration and control settings on the cardiograph.

Figure 4-14   Simulated 12-Lead ECG
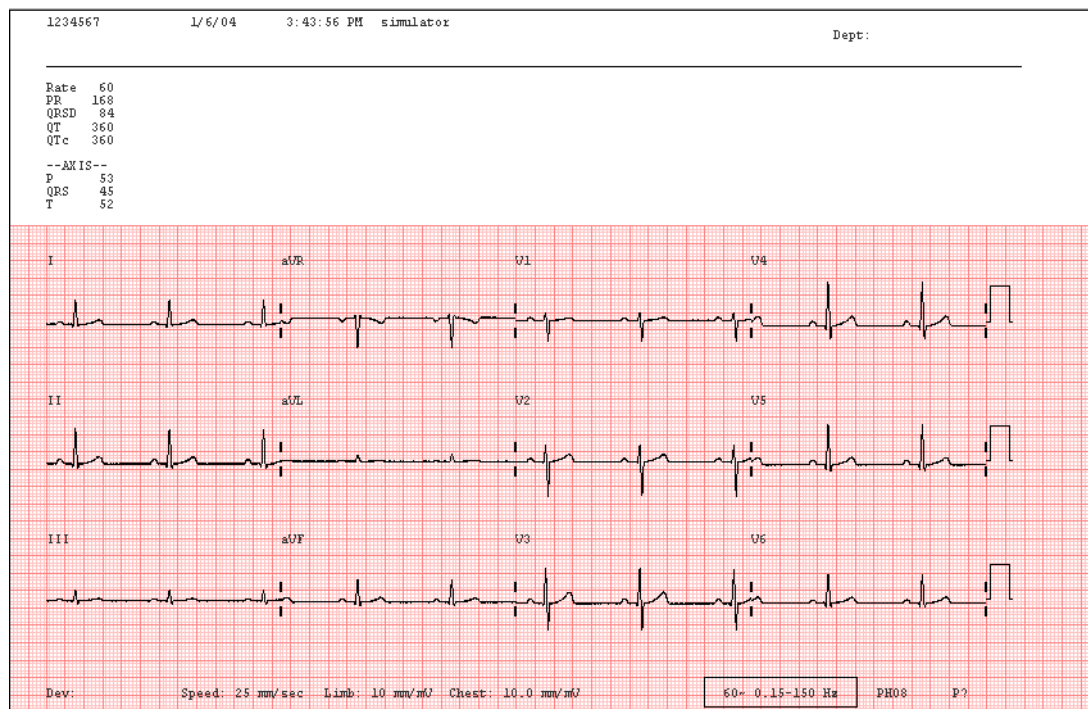
To make a simulated ECG recording

1   Connect the PIM lead wires to the simulator.

Verify that all lead wires are connected by observing the display for flat lines.

2   Touch the **Map** button on the Toolbar.

Check the leads map to be sure that a red *x* ❌ does not appear next to any electrodes.

3   Firmly pull each lead wire tight, and then look for excessive noise on the display (may be indicated by yellow or orange waveforms).

4   Touch the **ECG** button on the toolbar. If a message appears that no patient information has been entered, touch the **Continue** button.

Depending on how the cardiograph is configured, the ECG may automatically print. If not, touch the **Print** button.

5   Verify the following items when printing is complete:

– Trace activity for all leads. Confirms integrity for all patient electrodes and leadwires. Noise should measure less than one (1) mm, with no baseline wander.

– No gross distortion of complexes or calibration pulses (no overshoot and so forth).

– Duration for calibration pulses for correct paper speed. With cardiograph set to record at 25 mm/sec, the calibration pulse should measure 5mm (calibration pulse duration is 200 ms).

– Calibration pulse amplitude is correct.

NOTES ■ An arrhythmia simulator is not an acceptable tool for verifying computerized ECG analysis. The analysis software is biased to process human ECG data.

■ Noise may be an artifact of poor connections to the simulator or position of the cables. If noise appears, check the connectors or adjust the cable drape.
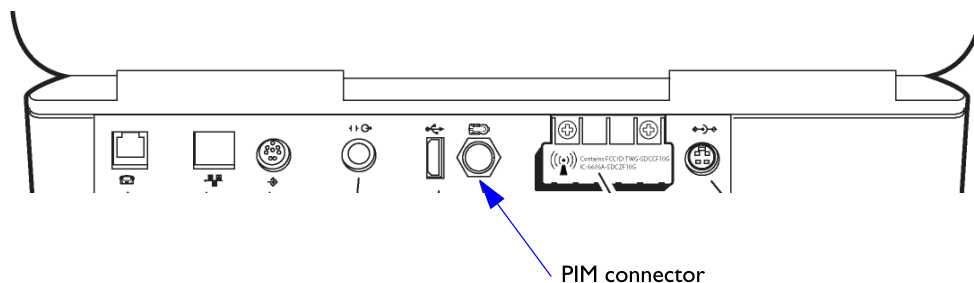
Safety Tests

This section covers tests of the cardiograph's electrical safety.

NOTE The PageWriter TC70 cardiograph is an electrical Class II device in which the protection against electrical shock does not rely on basic insulation and a protective earth conductor, but on double and reinforced insulation.

Test Notes

■ Use the procedures called out by the manufacturer of the safety analyzer in use.

■ Test both Normal and Reverse polarity line connections for each test, and record the worst-case value.

■ Use the barrel of the PIM connector to connect a test lead to chassis bare metal for the leakage tests.
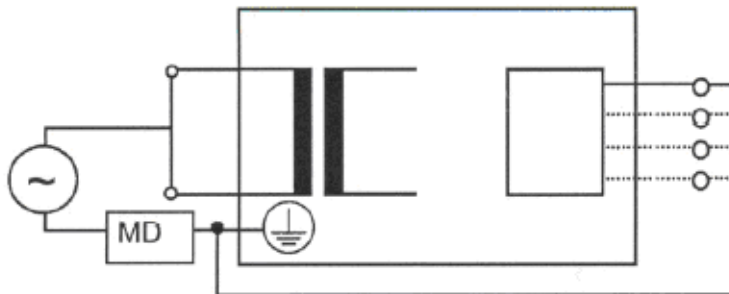

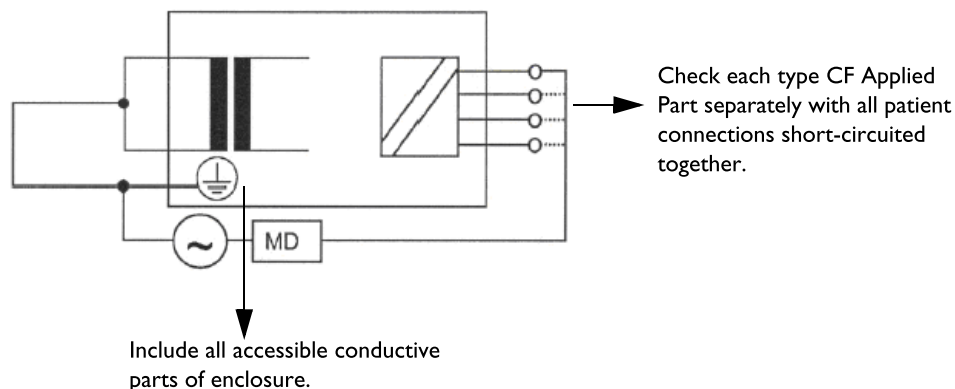PIM connector

Safety Test S1 - Earth Resistance Test
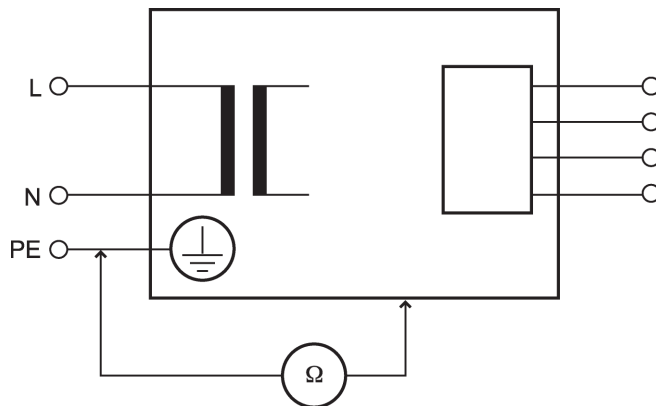
Limits: 200 mOhm using a reduced 200 mA test current

Safety Test S2 - Equipment Leakage

- Applicable to Class 1 and 2, type B, BF, CF

- For Class 1:

    – Protective Earth conductor is not connected

    – S = open

    – Measures equivalent leakage current to mains part from all applied parts and enclosure in parallel

    – Measures grounded and ungrounded metal parts

- Maximum leakage current $\leq$ 1000 uA

- Reference: VDE 0751

Safety Test S3 - Leads Leakage Current

Check each type CF Applied Part separately with all patient connections short-circuited together.

Include all accessible conductive parts of enclosure.

CF

■ Applicable to Class 1 and 2, type CF

■ Measures equivalent leakage current to mains part and enclosure from all applied parts in parallel

■ Maximum leakage current CF $\leq$ 50/100 uA. Tested separately (50 uA) or together (100 uA)

Password-Controlled Diagnostic Tests

More comprehensive diagnostic tests and operating statistics are provided in the Diagnostic Tests section of the Service Utility. These tests are used to identify and to troubleshoot a technical problem with the cardiograph and require a password to access.

All test results are entered in the Event log that is displayed on the screen. Additionally, you can save all log files to a USB memory stick. See "Viewing and Saving Log Files" on page 3-39 for information on log files.

The following tests are available:

■ "Flash Memory Test" on page 4-23

■ "Internal CF Test" on page 4-24

■ "Audio Test" on page 4-24

■ "Keyboard/Hardware Key Test (K)" on page 4-24

To access the password-protected Diagnostic Test screen:

1   From the Main screen, touch **Setup**.

2   Touch **Service Utilities**.

3   Touch **Diagnostic and Test Utilities**.

4   Type the password, *000000*, in the Enter Password for Diagnostic Tests field, and touch **Submit**.

N O T E   If typing the password using an AZERTY (French) keyboard, press and hold the *Enter* key while typing the password.

The expanded screen appears.
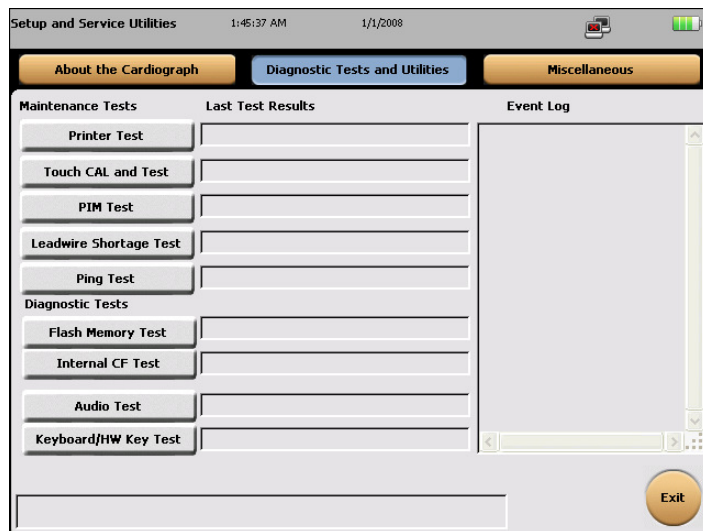
You can now access the individual tests, as described next.

Flash Memory Test

This test verifies that the onboard Flash memory is working properly.

N O T E   This is a password-controlled test.

To test the onboard Flash memory:

1   Touch the **Flash Memory Test** button on the Diagnostic and Test Utilities screen (page 4-23).

A message lets you know whether the onboard Flash memory passed the test.

2   Touch **Close.**

If the onboard flash card fails the test, try the test again. If it fails again, consult Chapter 3, "Troubleshooting."

Internal CF Test

This test verifies that the internal Compact Flash is working properly.

NOTE   This is a password-controlled test.

To test the Internal Compact Flash:

1   Touch **Internal CF Test** on the Diagnostic and Test Utilities screen (page 4-23).

   A message informs you whether the Internal Compact Flash passed the test.

2   Touch **Close**.

   If the compact flash card fails, try the test again. If it fails again, consult Chapter 3, "Troubleshooting."

Audio Test

This test determines whether the cardiograph is emitting sounds.

NOTE   This is a password-controlled test.

To test audio:

1   Touch **Audio Test** on the Diagnostic and Test Utilities screen (page 4-23).

   The test emits audible chime tones.

2   Touch **Yes** when the see the message Did you hear the sound playing?

   A message informs you that the audio test passed.

3   Touch **No** if you did not hear the sound playing.

   A message informs you that the audio test failed. If this occurs, consult Chapter 3, "Troubleshooting."
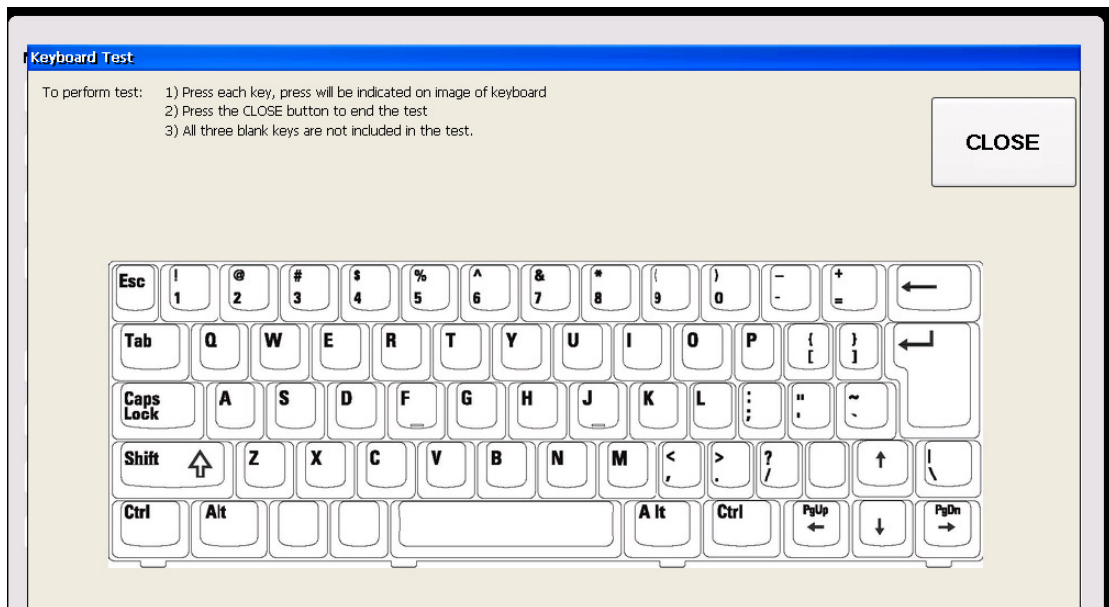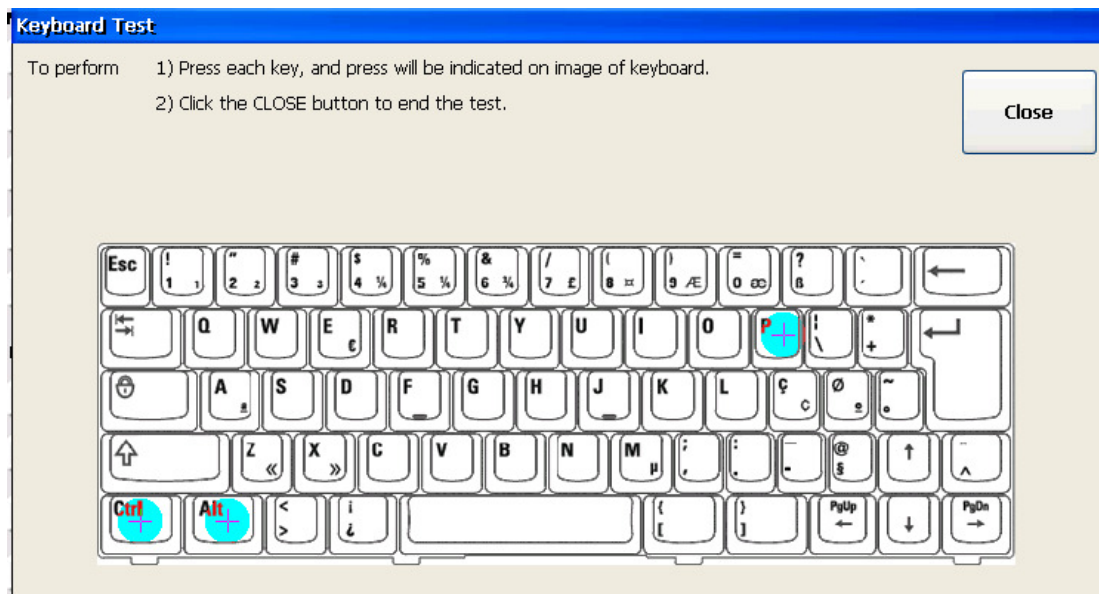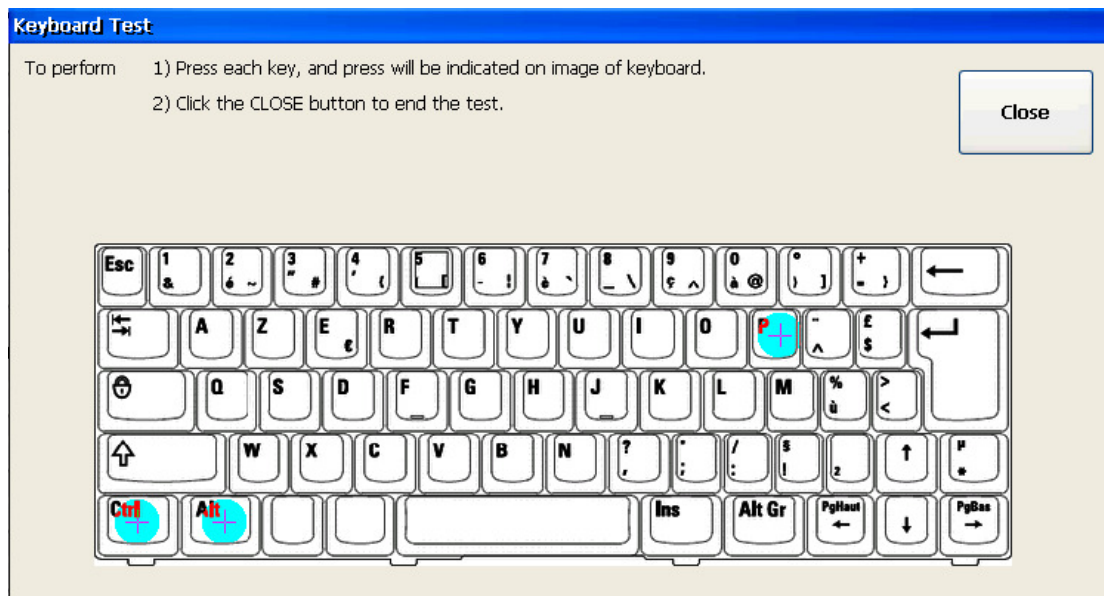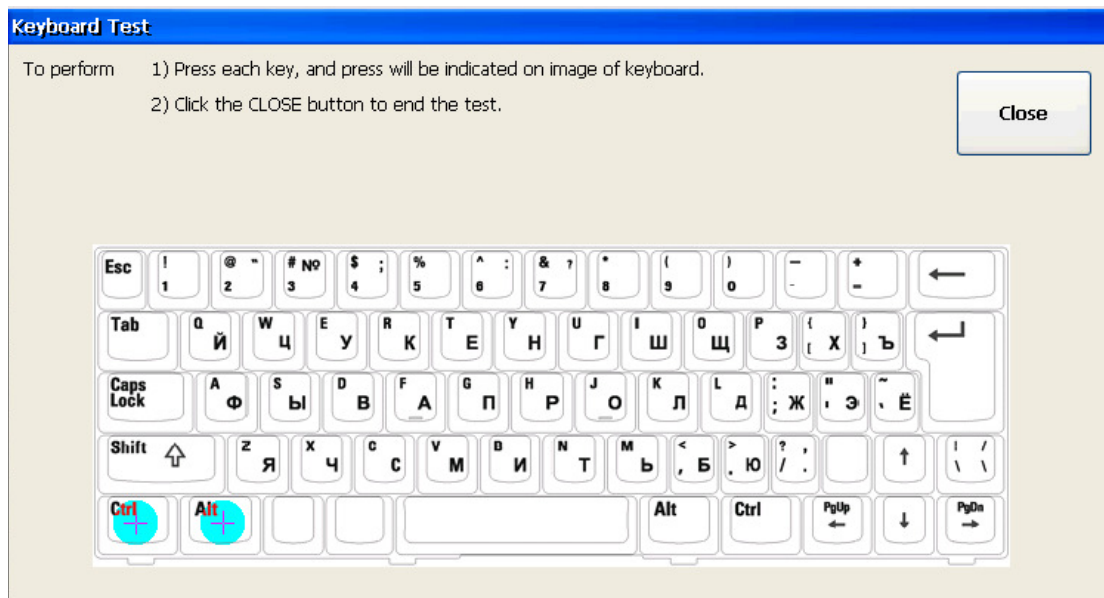
4   Touch **Close**.

Keyboard/Hardware Key Test (K)

A successful Keyboard test is one in which each key is properly recognized when pressed.

NOTE   This is a password-controlled test.

To test the keyboard:

1   Touch **Keyboard**/**HW Key Test** on the Diagnostic and Test Utilities screen (page 4-23).

   The Keyboard Test window appears.

Figure 4-15   Keyboard Test window (US Keyboard)

Figure 4-16   Keyboard Test window (European keyboard)

Figure 4-17   Keyboard Test window (French AZERTY keyboard)

Figure 4-18   Keyboard Test window (Russian keyboard)

2   Press each key on the keyboard. If a key is highlighted, the key is registered.

3   After all the keys are highlighted, touch **Close**.

A message informs you whether the test passed or failed. The test fails if any of the keys are not recognized when you press them or if you do not press all of the keys.