

**CardioChek<sup>®</sup>  Plus**  
**Professional Test System**

**Portable Whole Blood  
Test System  
User Guide**



**For Professional Use**

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# I. INTRODUCTION

## **CardioChek® Plus**

### ***Intended Use***

The CardioChek Plus test system is a small, portable analyzer and test strip system intended for multiple-patient use in professional healthcare settings. This system should only be used with single-use, auto-disabling lancing devices. This system is for *in vitro* diagnostic use only. The test strips are for the quantitative determination of glucose, total cholesterol, HDL (high density lipoprotein) cholesterol, and triglycerides in venous whole blood and capillary whole blood from the fingertip. A Chol/HDL ratio and estimated values for LDL (low density lipoprotein) cholesterol and non-HDL cholesterol are calculated by the CardioChek Plus analyzer.

- Cholesterol measurements are used in the diagnosis and treatments of disorders involving excess cholesterol in the blood and lipid and lipoprotein metabolism disorders.
- HDL (lipoprotein) measurements are used in the diagnosis and treatment of lipid disorders (such as diabetes mellitus), atherosclerosis, and various liver and renal diseases.
- Triglycerides measurements are used in the diagnosis and treatment of patients with diabetes mellitus, nephrosis, liver obstruction, other diseases involving lipid metabolism or various endocrine disorders.
- Glucose measurements are used in the diagnosis and treatment of carbohydrate metabolism disorders including diabetes mellitus, neonatal hypoglycemia, and idiopathic hypoglycemia, and of pancreatic islet cell carcinoma.

This user guide is for professional users. The CardioChek Plus professional test system may be used with an optional printer, optional software solutions (a software accessory to provide personalized health related information using cholesterol results), and has wireless communication capability to assist in data reporting.

This analyzer is a component of a test system that includes PTS Panels® eGLU test strips, PTS Panels® glucose test strips and PTS Panels® lipid panel test strips. The PTS Panels test strip box includes a lot-specific MEMo Chip® that contains the assay calibration curve and other important information about the assay. PTS Panels test strips are sold separately, and are available as single and multiple-analyte test strips.

The test system uses reflectance photometry and electrochemical biosensor technology. Reflectance test strips utilize an enzymatic reaction to produce a color change that is detected by the analyzer after whole blood is applied. Electrochemical test strips measure an electrical current when whole blood is applied.

## I. INTRODUCTION, continued

This professional user guide includes all the information that you need to run point-of-care assays using the CardioChek Plus professional test system. Before you begin testing, please read this entire user guide and the package inserts (instructions for use), which are included with the PTS Panels test strips.

Please remember to return the enclosed warranty card to PTS, Inc. to ensure that you receive product updates and other important information. For questions or additional assistance with your CardioChek Plus test system, please contact PTS, Inc. (Hours: 8:00 a.m. to 5:00 p.m. US EST) using the following contact information:

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Indianapolis, IN 46268 USA

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Email: [inforequest@ptsdiagnostics.com](mailto:inforequest@ptsdiagnostics.com)

Website: <http://www.ptsdiagnostics.com>

### **Important Safety Instructions**

Users should adhere to Standard Precautions when handling or using this analyzer. All parts of the glucose monitoring system should be considered potentially infectious and are capable of transmitting blood-borne pathogens between patients and healthcare professionals. For more information, refer to “*Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings 2007*”, <http://www.cdc.gov/hicpac/2007ip/2007isolationprecautions.html>

The analyzer should be cleaned and disinfected after use on each patient. This system may only be used for testing multiple patients when Standard Precautions and the manufacturer’s disinfection procedures are followed.

Only auto-disabling, single use lancing devices may be used with this device.

## **II. INTRODUCTION TO THE CARDIOCHEK PLUS PROFESSIONAL TEST SYSTEM**

### **The CardioChek Plus Professional Test System**

The CardioChek Plus professional test system consists of three main parts. These include the CardioChek Plus professional analyzer, PTS Panels® test strips, and a lot-specific MEMo Chip®.

### **The CardioChek Plus Professional Test System and Operating Principle**

The analyzer employs both light reflectance and electrochemical biosensor technology to measure an enzymatic chemical reaction. When a blood sample is applied to a reflectance test strip, a chemical reaction occurs that produces a color change on the test strip. When blood is applied to an electrochemical test strip, a current is produced. This color or current is measured and compared to a calibration curve stored in the lot-specific MEMo Chip. The analyzer converts this color or current reading into a test result (the darker the color or greater the electrical current, the higher the analyte concentration). The test result appears on the display screen.

## II. INTRODUCTION TO THE CARDIOCHEK PLUS PROFESSIONAL TEST SYSTEM, continued



### Display (A)

Display shows test results, messages, time, date, and stored results.

### Enter Button (B)

Press this button to turn on the analyzer or to accept the current menu choice.

### Reflectance Test Strip Slot (C)

The reflectance test strip slot is positioned in the lower front-center of the analyzer. The reflectance test strip is inserted here with the smooth side facing down.

### MEMo Chip Port (D)

The MEMo Chip port is located at the top of the analyzer.

### USB Port (E)

A port that allows communication with a CardioChek branded printer only.

### Next Button (F)

Press this button to turn on the analyzer or to advance to the next menu option.

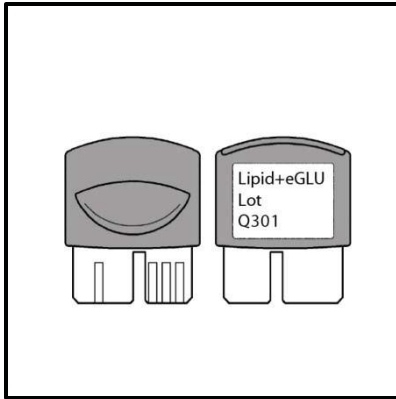
### Electrochemical Test Strip Port (G)

The electrochemical test strip port is positioned just to the right of the reflectance test strip slot. The electrochemical test strip is inserted here with the arrow facing up and pointing toward the analyzer.

## II. INTRODUCTION TO THE CARDIOCHEK PLUS PROFESSIONAL TEST SYSTEM, continued

### The MEMo Chip

Each package of PTS Panels test strips contains a color-coded lot-specific MEMo Chip. The color-coded MEMo Chip contains the settings for each test.



The top of the MEMo Chip has a finger notch. The bottom has a label with the test name and lot number. Always make sure you insert the MEMo Chip into the port with the finger notch facing up.

### What does the MEMo Chip do?

The MEMo Chip contains proper settings for the test strip lot you are using. The MEMo Chip:

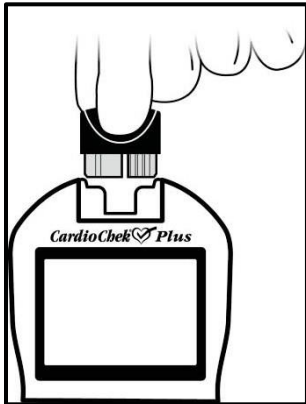
- Reads the test strip expiration date
- Tells the analyzer which test(s) to run
- Contains the calibration curve and the lot number for the specific test strip lot
- Controls test sequences and timing
- Provides the measuring range for the test

### Guidelines for using the MEMo Chip

- The MEMo Chip must be inserted to run a test.
- Use only the MEMo Chip that is included with each package of test strips. The lot number code on the test strip vial(s), MEMo Chip, and analyzer display must match.
- If the expiration date in the MEMo Chip has passed, the analyzer will display EXPIRED LOT.
- If your MEMo Chip is lost or misplaced, please call PTS, Inc. Customer Service for a replacement.



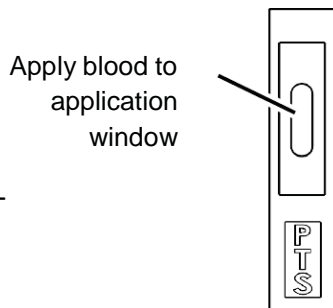
## II. INTRODUCTION TO THE CARDIOCHEK PLUS PROFESSIONAL TEST SYSTEM, continued



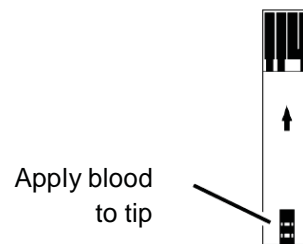
The MEMo Chip port is located at the top center of the analyzer. The MEMo Chip is inserted into this port with the finger notch facing up. Push firmly, but gently, until the MEMo Chip is fully inserted. **Important:** Be careful not to bend the connector.

### Test Strip

Test strips are designed for specific analytes. A test strip is inserted into the analyzer, then blood is applied to the blood application window for reflectance tests or the tip of the test strip for electrochemical tests. As previously described, the ensuing chemical reaction produces a color change or an electrical current, which the analyzer measures and compares to the calibration curve stored in the lot-specific MEMo Chip. The analyzer converts this color reading or electrical current measurement into a test result, displayed on the screen. Each PTS Panels test strip box contains a package insert that provides instructions for use and information specific for each test. Please read the instructions completely before testing.



**Example of a reflectance test strip**



**Example of an electrochemical test strip**

## II. INTRODUCTION TO THE CARDIOCHEK PLUS PROFESSIONAL TEST SYSTEM, continued

### Limitations

#### PTS Panels eGLU Test Strips

##### LIMITATIONS OF THE PROCEDURE

1. The analyzer should not be used to test critically ill patients.
2. Blood samples from patients in shock, patients with severe dehydration, or patients in a hyperosmolar state (with or without ketosis) have not been tested. It is not recommended to test those samples with this system.
3. PRESERVATIVES: Blood samples preserved with Fluoride or Oxalate should not be used for testing with this system.
4. VENOUS SAMPLES: To minimize glycolysis, venous whole blood samples must be tested within 20 minutes of the draw. Grossly lipemic samples may interfere with some methodologies. Critically ill patients should not be tested by this method, or tested with extreme caution.
5. NEONATAL USE and ARTERIAL BLOOD: This product has not been tested using neonatal or arterial blood. This test system should not be used with these whole blood samples. This test system is specific for glucose. Other sugars or reducing substances such as ascorbic acid at normal blood concentrations have no significant effect on test results. Acetaminophen (Tylenol) and dopamine may interfere causing the test result to be higher than the actual glucose. Not every drug was tested.
6. METABOLITES: This test system is specific for glucose. Other sugars and other reducing substances such as ascorbic acid at normal blood concentrations have no significant effect on test results.
7. HEMATOCRIT: Hematocrit values above 55% or lower than 30% may incorrectly lower the glucose result.
8. ALTITUDE: Testing at altitudes up to 5280 feet has no effect on results.
9. DEHYDRATION: Severe dehydration and excessive water loss may produce falsely low results.

#### PTS Panels Glucose Test Strips

##### LIMITATIONS OF THE PROCEDURE

1. The analyzer should not be used to test critically ill patients.
2. Blood samples from patients in shock, patients with severe dehydration, or patients in a hyperosmolar state (with or without ketosis) have not been tested. It is not recommended to test those samples with this system.
3. PRESERVATIVES: Blood samples preserved with Fluoride or Oxalate should not be used for testing with this system.

## II. INTRODUCTION TO THE CARDIOCHEK PLUS PROFESSIONAL TEST SYSTEM, continued

4. **NEONATAL USE and ARTERIAL BLOOD:** This product has not been tested using neonatal or arterial blood. This test system should not be used with these blood samples. This test system is specific for glucose. Other sugars or reducing substances such as ascorbic acid at normal blood concentrations have no significant effect on test results. Acetaminophen (Tylenol) and dopamine may interfere causing the test result to be higher than the actual glucose. Not every drug was tested.
5. **METABOLITES:** This test system is specific for glucose. Other sugars and other reducing substances such as Vitamin C at normal blood concentrations have no significant effect on test results.
6. **HEMATOCRIT:** Hematocrit values above 55% or lower than 30% may incorrectly lower the glucose result.
7. **ALTITUDE:** Testing at altitudes up to 5280 feet has no effect on results.
8. **DEHYDRATION:** Severe dehydration and excessive water loss may produce falsely low results.

### **PTS Panels Lipid Panel Test Strips LIMITATIONS OF THE PROCEDURE**

Studies were performed to test for substances that may interfere with these tests. The results are below.

1. **PRESERVATIVES:** EDTA and heparin in venous blood collection tubes had no effect on the results of the test strip.
2. **DRUGS:** Dopamine and methyldopa decreased the results of all the lipids.
3. **METABOLITES:** Extremely high doses of ascorbic acid (Vitamin C) decreased the results of all the lipids.
4. **HEMATOCRIT:** No hematocrit effect was observed for samples between 30 and 45% HCT.
5. **NEONATAL USE:** This product has not been tested using neonatal blood. This test system should not be used with these samples.
6. **Cosmetics** such as hand creams or lotions often contain glycerol. Use of these products may cause inaccurate results.
7. **Displayed results** are rounded.

Each test strip is for a single test only. Do not reuse the strips. Use a new test strip each time you test. Use only fresh capillary whole blood from the finger or venous whole blood (EDTA or heparin). Performance testing was done using EDTA preserved whole blood. Do not use serum or plasma unless specified in the package insert. Each test strip has a package insert which contains instructions for use specific to that test strip.

Only auto-disabling, single use lancing devices should be used with this device.

## III. SETUP

### Battery Use and Replacement

The CardioChek® Plus professional analyzer requires four (4) AA 1.5 volt high-quality alkaline batteries.

### When to Replace the Batteries

The analyzer will give you an indication on the display that the batteries need to be changed. When the display reads REPLACE BATTERIES, no more tests can be run until the batteries are changed. Always replace the batteries with high-quality alkaline batteries. It is recommended to keep a spare set of batteries on hand. To extend battery life, remove the test strip as soon as a result is displayed. The time/date and results stored in memory will not be erased when the batteries are changed.

When the REPLACE BATTERIES message is displayed, replace the batteries with **4 new AA alkaline batteries of the same brand.**

Do not use NiCad or rechargeable batteries.

***Caution: Improper installation of batteries can result in decreased battery life or damage to the analyzer.***

### How to Install/Replace the Batteries:

1. Open the battery door on the back of the CardioChek Plus professional analyzer by releasing the latch and pulling the door away from the back of the analyzer.
2. Remove old batteries from the compartment and properly discard.
3. Insert the new batteries into the battery compartment with the positive (+) terminals correctly facing as marked on the inside compartment.
4. Replace the battery door. To make sure the batteries were installed correctly, push either of the two buttons on the front of the analyzer to turn on the CardioChek Plus professional analyzer.

**Warning:** Dispose of the old batteries properly.



### III. SETUP, continued

#### CardioChek Plus Professional Analyzer Menus



The following diagram provides a layout of the menus within the CardioChek Plus professional analyzer. Detailed information on the use of each menu follows. Use the following buttons to navigate the menus:

#### Enter Button

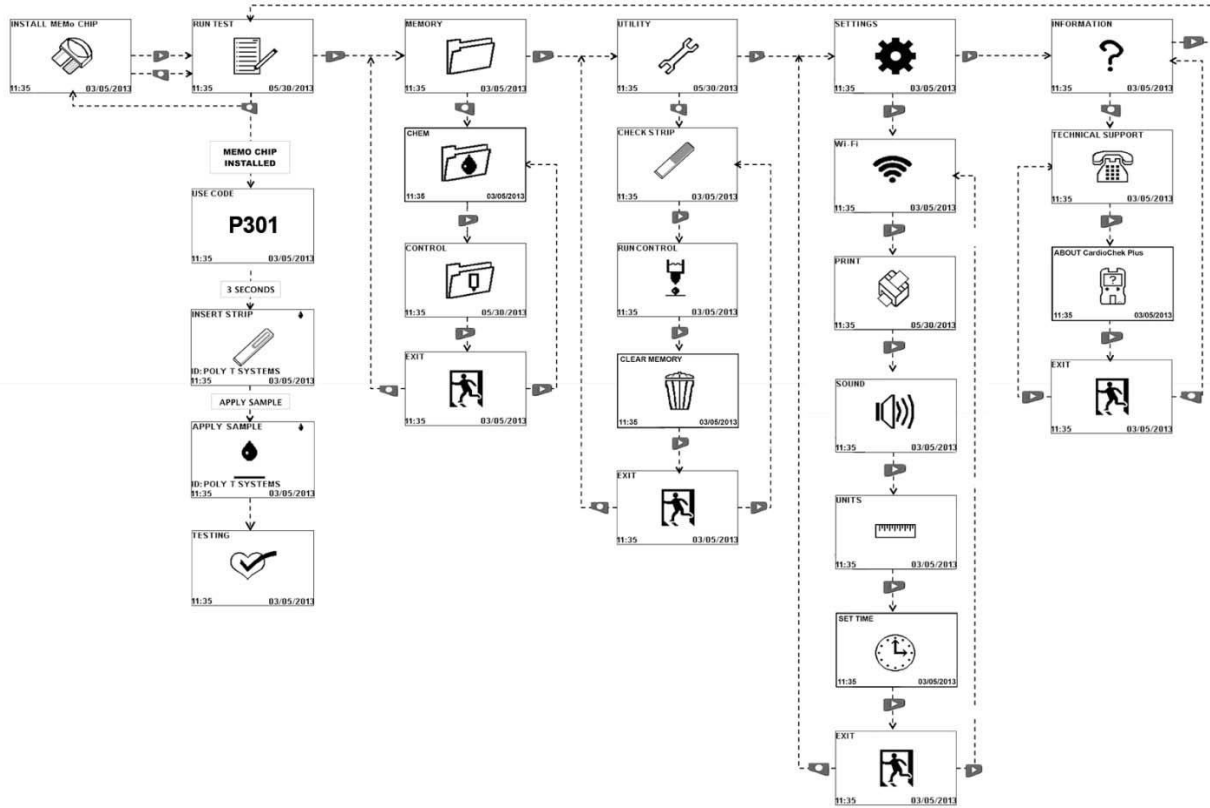
Press this button to turn on the analyzer or to accept the current menu choice.

#### Next Button

Press this button to turn on the analyzer or to advance to the next menu option.

**Note:** Hold  and  down at the same time for three seconds to turn off the analyzer.

### III. SETUP, continued



Note: If the units are locked, the UNITS screen does not appear.

## III. SETUP, continued

### How to Turn Off the Analyzer

To turn off the analyzer, press both buttons (Enter and Next) at the same time for three seconds. After three minutes of idle time (without a test strip or check strip inserted), the analyzer will perform a 6 second count down and turn off. To stop shutdown, press either button. You can also remove the batteries to turn off the analyzer.

### Setting Language

The first time the analyzer is turned on, you will be required to set the language, date, and time. The language menu consists of the following choices: English (ENGLISH), Spanish (ESPAÑOL), Italian (ITALIANO), German (DEUTSCH), French (FRANÇAIS), Portuguese (PORTUGUÊS), Dutch (NEDERLANDS), Chinese (中文), and Russian (РУССКИЙ).

### How to Set the Language (First-Time Use)

1. Turn on the analyzer by pressing either button (Enter or Next).
2. The display will read LANGUAGE. Press Enter.
3. ENGLISH will be displayed. Press Enter if English is desired.
4. For other languages press Next until the desired language is displayed, then press Enter. To set the date and time, proceed to the [How to Set the Date and Time](#) section.

### III. SETUP, continued

#### How to Reset the Language

1. Turn off the analyzer.
2. Press and hold down Enter for approximately 5 seconds during the analyzer power-up stage until LANGUAGE is displayed.
3. Press Enter. Press Enter again to select English or press Next to scroll through the language choices.
4. Press Enter to select the desired language that is displayed.

#### How to Set the Date and Time

1. If the analyzer is off, press either button to turn on the analyzer. Wait for the display to read either INSTALL MEMO CHIP (if a current MEMO Chip<sup>®</sup> is not installed) or INSERT STRIP (if a current MEMO Chip is installed).  
**Note:** If RUN TEST is displayed, go to Step 3.
2. Press Enter. The display will read RUN TEST.
3. Press Next until SETTINGS is displayed.
4. Press Enter, then press Next until SET TIME is displayed.
5. Press Enter to display the date and the time, which is formatted as YYYY/MM/DD and HH:MM.
6. The display will then highlight the year. Press Enter to accept the highlighted year, or press Next to advance the year. Press Enter to select.
7. The display will then highlight the month. Press Enter to accept the displayed month, or press Next to advance the month. Press Enter to select.
8. The display will then highlight the day. Press Enter to accept the displayed day, or press Next to advance the day. Then press Enter to select.



### **III. SETUP, continued**

#### **How to Set the Date and Time, continued**

9. The display will then highlight the hour. Press Enter to accept the displayed hour, or press Next to advance the hour. Press Enter to select.
10. The display will then highlight the minutes. Press Enter to accept the displayed minutes, or press Next to advance the minutes. Press Enter to select.
11. The display will then highlight AM or PM. Press Enter to accept the AM/PM 12-hour clock format, or press Next to switch to the 24-hour clock format.
12. Once the clock format has been selected, the SET TIME menu will display. Press Next until EXIT is displayed and press Enter to return to SETTINGS.

### III. SETUP, continued

#### How to Set the Units



The CardioChek Plus professional analyzer may be shipped with preset units. If the SETTINGS menu does not display UNITS, the analyzer is locked in preset units. The units cannot be changed if the system has been locked. If your analyzer's units have not been preset, follow the steps listed below to change your units to mg/dL, mmol/L, or g/L (e.g., in the US, the correct units for glucose are mg/dL and the units are preset to mg/dL).

1. If the analyzer is off, press either button to turn on the analyzer. Wait for the display to read INSTALL MEMO CHIP or INSERT STRIP.  
**Note:** If RUN TEST is displayed, go to Step 3.
2. Press Enter. The display will read RUN TEST.
3. Press Next until SETTINGS is displayed.
4. Press Enter, then press Next until UNITS is displayed. If UNITS is not shown on the display, the units on this analyzer have been locked and cannot be changed. If UNITS appears on the display screen, proceed to the next step.
5. Press Enter. The display will highlight mg/dL. If mmol/L or g/L is desired, press Next until the desired units are highlighted on the display screen and then press Enter to select.
6. The display will then read UNITS. Press Next until EXIT is displayed.
7. Press Enter to return to SETTINGS.
8. Press Next to return to RUN TEST.

### III. SETUP, continued

#### How to Set the Sound



The CardioChek Plus professional analyzer sound has been preset to on. To turn the sound on or off, follow the steps listed below:

1. If the analyzer is off, press either button to turn on the analyzer. Wait for the display to read INSTALL MEMO CHIP or INSERT STRIP.  
**Note:** If RUN TEST is displayed, go to Step 3.
2. Press Next. The display will read RUN TEST.
3. Press Next until SETTINGS is displayed.
4. Press Enter, then Next until SOUND is displayed.
5. Press Enter. The display will highlight  (on) .
6. Press Enter to select sound or press Next to highlight  (off).
7. Press Enter to accept the sound choice highlighted.
8. Press Next until EXIT is displayed.
9. Press Enter to return to SETTINGS.
10. Press Next to return to RUN TEST.

### III. SETUP, continued

#### How to Set the Wi-Fi On or Off

The CardioChek Plus professional analyzer wireless communication has been preset to off. To turn the Wi-Fi to on or off, follow the steps listed below:

1. If the analyzer is off, press either button to turn on the analyzer. Wait for the display to read INSTALL MEMO CHIP or INSERT STRIP.  
**Note:** If RUN TEST is displayed, go to Step 3.
2. Press Next. The display will read RUN TEST.
3. Press Next until SETTINGS is displayed.
4. Press Enter. Wi-Fi is displayed.
5. Press Enter. The display will highlight  (Wi-Fi on).
6. Press Enter to select Wi-Fi on or press Next to highlight  (Wi-Fi off).
7. Press Enter to accept the Wi-Fi choice highlighted.
8. Press Next until EXIT is displayed.
9. Press Enter to return to SETTINGS.
10. Press Next to return to RUN TEST.

**Note:** If unable to run a test, wireless communication and patient ID lock may be on. You will see a Wi-Fi symbol flashing. To run a test, send a new patient ID to the analyzer, turn off wireless communication or press and hold both buttons on your analyzer to override the patient ID lock. See the [Wi-Fi Statement](#) section for additional information regarding wireless compatibility.

### III. SETUP, continued

#### **How to Set Up the CardioChek Plus Professional Analyzer for Printing**

The CardioChek Plus professional analyzer supports printing only on CardioChek branded printers.

1. If the analyzer is off, press either button to turn on the analyzer. Wait for the display to read INSTALL MEMO CHIP or INSERT STRIP.

**Note:** If RUN TEST is displayed, go to Step 3.

2. Press Next. The display will read RUN TEST.
3. Press Next until SETTINGS is displayed.
4. Press Enter, then Next until PRINT is displayed.
5. Press Enter to display PRINT COPIES.
6. Press Enter to display icons for one, two, or three copies.
7. Press Enter to select or Next to highlight the desired option.
8. Press Enter to accept and return to PRINT COPIES.

### III. SETUP, continued

#### Testing the Printer

1. If the analyzer is off, press either button to turn on the analyzer. Wait for the display to read INSTALL MEMO CHIP or INSERT STRIP.  
**Note:** If RUN TEST is displayed, go to Step 3.
2. Press Next. The display will read RUN TEST.
3. Press Next until SETTINGS is displayed.
4. Press Enter, then Next until PRINT is displayed.
5. Press Enter, then Next until TEST PRINTER is displayed.
6. Press Enter and a sample printout will be generated.

#### How to Print Results from Memory

**Note:** Up to 50 test results per chemistry and 10 control test results can be stored.

1. If the analyzer is off, press either button to turn on the analyzer. Wait for the display to read INSTALL MEMO CHIP or INSERT STRIP.  
**Note:** If RUN TEST is displayed, go to Step 3.
2. Press Next. The display will read RUN TEST.
3. Press Next until MEMORY is displayed, then press Enter.
4. Press Enter to select CHEM or press Next, then Enter to select CONTROL.
5. Press Next to highlight the test name, then press Enter to select (LIPIDS for example).
6. Press Next to highlight the date/time of the test result you want to print.
7. Press Enter to print the selected results.

### III. SETUP, continued

#### How to Get Help and Information Regarding Your CardioChek Plus Professional Analyzer

1. If the analyzer is off, press either button to turn on the analyzer. Wait for the display to read INSTALL MEMO CHIP or INSERT STRIP.  
**Note:** If RUN TEST is displayed, go to Step 3.
2. Press Next. The display will read RUN TEST.
3. Press Next until INFORMATION is displayed.
4. Press Enter, then TECHNICAL SUPPORT is displayed.
5. Press Enter to display contact information.
6. Press Enter, then Next for ABOUT CardioChek Plus display.
7. Press Enter to display serial number (SN) and software version information.
8. Press Next to display wireless IP address and SSID (if applicable).
9. Press Enter to return to ABOUT CardioChek Plus display.
10. Press Next until EXIT, then press Enter.
11. Press Next to return to RUN TEST.

## IV. CHECKING THE SYSTEM

### **Analyzer Check Strips**

A check of the analyzer operation can be performed using the gray check strip. Two are included in the analyzer carrying case. The check strip verifies that the CardioChek® Plus professional analyzer's electronic and optical systems are functioning properly. To perform this verification, insert the check strip into the analyzer. The analyzer will read the reflectance of the gray check strip and indicate if the reading is within the specified acceptable range, by displaying PASSED. When the check strip is not in use, store it in the analyzer carrying case. It is recommended that the check strip verification be performed:

- Daily
- If the analyzer has been dropped
- When a result is not consistent with expected results

### **How to Use the Analyzer Check Strip**

1. Turn on the analyzer by pressing either button.
2. When INSTALL MEMO CHIP or RUN TEST is displayed, press Next until UTILITY is displayed. Press Enter.
3. Press Enter when CHECK STRIP is displayed.
4. Hold the check strip at the base and insert the check strip, ribbed side up, into the reflectance test strip slot when INSERT STRIP is displayed.
5. The analyzer should display PASSED, along with a checkmark icon. (If the display reads FAILED, see the note at the end of this section.) Remove the check strip and store it in the analyzer carrying case.
6. Press Next until EXIT is displayed. Press Enter.
7. Press Next until RUN TEST is displayed.
8. Press Enter. The analyzer is ready to run tests.



## IV. CHECKING THE SYSTEM, continued

**Note:** If the analyzer displays FAILED:

1. Clean the CardioChek Plus professional analyzer test strip slot (where the check strip is inserted into the analyzer). See [Section IX. Care and Cleaning](#).
2. Inspect the check strip to make sure it is not dirty or damaged. Use the spare check strip and repeat.
3. See [Section X. Troubleshooting](#) in this user guide.

## V. QUALITY CONTROL TESTING

### Quality Control

Controls (also known as “quality control materials”) are solutions for which an expected analyte concentration range has been established. Controls are tested to check the performance of your test system: CardioChek® Plus Professional Analyzer, MEMo Chip®, and PTS Panels® test strips. Use quality control materials provided by PTS, Inc. or commercially available quality control materials.

Refer to the Range Card provided with the controls or visit <http://www.pt diagnosti cs.com> for control specifications.

Healthcare professionals should follow their facility’s guidelines and policies regarding quality assurance and the use of quality control materials. Quality control materials should be run whenever a new lot of PTS Panels test strips are received and according to state, local, and federal regulations..

**Important:** Check the expiration date printed on the control bottles. Do not use control solutions that have expired.

For performing a quality control test, see the instructions below.

To perform a control test you need:

- CardioChek Plus Professional Analyzer
- PTS Panels test strips
- Quality control materials
- Quality control instructions
- Quality Control Range Card

## V. QUALITY CONTROL TESTING, continued

### **How to Run a Quality Control Test on Reflectance Test Strips**

Refer to the instructions for use provided with your quality control materials.

### **If Quality Control Results Are Not in Range**

**IMPORTANT: Patient tests should not be performed until control results are within range.**

1. Ensure test strip slot area is clean.
2. Make sure neither the test strips nor the controls are past the expiration date printed on the label.
3. Make sure the MEMo Chip matches the test strip lot.
4. Repeat the test again using fresh materials.
5. Call Customer Service for assistance.

## V. QUALITY CONTROL TESTING, continued

### How to Run a Quality Control Test on Electrochemical Test Strips

Refer to the instructions for use provided with your quality control materials.

### If Quality Control Results Are Not in Range

**IMPORTANT: Patient tests should not be performed until control results are within range.**

1. Ensure test strip port area is clean.
2. Make sure neither the test strips nor the controls are past the expiration date printed on the label.
3. Make sure the MEMo Chip matches the test strip lot.
4. Repeat the test again using fresh materials.
5. Call Customer Service for assistance.

## VI. RUNNING A TEST

### Blood Testing

A package insert is included with each box of PTS Panels® test strips. Please read the test strip package insert and this section of the user guide completely and carefully before testing.

### Testing Supplies

To perform a blood test you need:

- CardioChek® Plus Professional Analyzer
- PTS Panels test strips
- Lot-specific MEMo Chip®
- Sterile lancet
- Pipet or capillary blood collector
- Gauze or cotton balls
- Alcohol wipe (optional)

This analyzer requires whole blood for testing. Do not operate the analyzer in direct light. Reference the [Section IX Care and Cleaning](#) section for more information.

### Helpful Hints on Getting a Good Drop of Blood

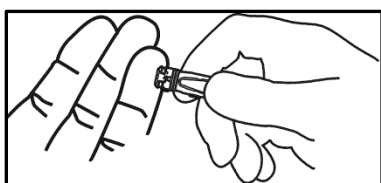
1. Instruct the patient to wash hands in warm, soapy water.
2. Rinse well and dry completely. If an alcohol wipe is used, let the finger air dry before testing.
3. Warm the fingers to increase blood flow.
4. Let the arm hang down at the patient's side briefly to allow blood flow to the finger tips.

## VI. RUNNING A TEST, continued

### How to Obtain a Blood Sample

A new pair of clean gloves should be worn by the user before testing each patient.

1. Clean the finger. Be sure the finger is completely dry.
2. Use a new, sterile, disposable lancet to puncture the skin.
3. Stick the finger on the side of the fingertip, instead of the center. See the following picture:



4. To get a drop of blood, gently apply pressure to the finger starting at the end of the finger closest to the hand and moving towards the tip.
  - If running an electrochemical test with a reflectance test, apply a blood sample to the tip of the electrochemical test strip, wipe away any remaining blood with gauze from the fingertip, and collect a second blood sample for the reflectance test.
  - If only running a reflectance test, lance the finger, wipe away the first drop of blood with gauze, and use the second blood drop for testing. The blood drop should be hanging down from the finger to make it easier to collect the sample with a pipet or capillary blood collector.
5. Follow the specific instructions found in the test strip package insert for each test for sample application and volume ranges. For reflectance tests, use of a pipet or capillary blood collector ensures a sufficient volume of blood has been applied to the test strip.
6. Make sure the test strip is inserted all the way into the test strip slot.
7. Use the test strip and lancet one time only. Only auto-disabling, single use lancing devices may be used with this device. **Dispose of properly.**

**Precaution:** Handle and dispose of all materials coming in contact with blood according to universal precautions and guidelines. All parts of the system should be considered potentially infectious and are capable of transmitting blood-borne pathogens between patients and healthcare professionals.

## VI. RUNNING A TEST, continued

It is recommended that users refer to the following practice guidelines:

*Biosafety in Microbiological and Biomedical Laboratories (BMBL) found at <http://www.cdc.gov/biosafety/publications/bmb15/>*

*“Protection of Laboratory Workers From Occupationally Acquired Infections; Approved Guideline-Third Edition” Clinical and Laboratory Standards Institute (CLSI) M29-A3.*

## VI. RUNNING A TEST, continued

### How to Run a Reflectance Test

1. Insert correct MEMo Chip for the lot of strips in use.
2. Insert MEMo Chip with finger notch (top) side up, lot number code facing down.
3. Press either button to turn on the analyzer.
4. When INSERT STRIP is displayed, insert the test strip into the analyzer as far as it will go.
5. Obtain a blood drop following the correct technique. (If venous blood is used, collect in an EDTA or heparin tube. Invert gently 5-7 times to mix completely. Immediately collect sample with glass capillary tube and dispense correct volume as specified in test strip instructions for use (package insert) onto test strip.)
6. When APPLY SAMPLE is displayed, apply blood to the test strip. Refer to each specific test strip package insert for sample volume and sample application instructions.
7. Within one to two minutes, the results will be displayed.
8. Remove test strip and discard.
9. The analyzer automatically shuts down after three minutes of idle time with no test strip inserted.

### How to Run an Electrochemical Test

1. Insert the MEMo Chip that matches the lot number on the test strip vial.
2. Press either button to turn on the analyzer.
3. Remove a single electrochemical test strip from the test strip vial and immediately replace the cap.
4. Insert the electrochemical test strip into the designated electrochemical test strip port.
5. APPLY SAMPLE icon appears on the display.
6. Obtain a blood drop following the correct technique. (If venous blood is used, collect in an EDTA or heparin tube. Invert gently 5-7 times to mix completely. Immediately collect sample with capillary tube, dispense large drop and touch drop to end of test strip.)
7. Gently hold finger to the tip of the electrochemical test strip to apply a drop of blood. Do not place blood on top of the test strip. Do not press the test strip into the finger.
8. Blood will be drawn into the strip automatically by capillary action.
9. TESTING will appear until the result is displayed.



## VI. RUNNING A TEST, continued

### How to Run an Electrochemical Test with a Reflectance Test

1. Insert the MEMo Chip that matches the lot number on both the electrochemical AND the reflectance test strip vials.
2. Press either button to turn on the analyzer.
3. Remove a single electrochemical test strip from the test strip vial and immediately replace the cap.
4. Insert the electrochemical test strip into the designated electrochemical test strip port.
5. Remove a single reflectance test strip from test strip vial and immediately replace cap.
6. Insert the reflectance test strip into the designated test strip slot.
7. The reflectance icon and electrochemical icon will display together.
8. For the electrochemical test:
  1. Obtain a drop of blood using a lancet per the correct technique.
  2. Gently hold finger to the tip of the electrochemical test strip to apply a drop of blood. Do not place blood on top of the test strip. Do not press the test strip into the finger.  
(If venous blood is used, collect in an EDTA or heparin tube. Invert gently 5-7 times to mix completely. Immediately collect sample with glass capillary tube and touch drop of blood to the tip of the test strip.)
  3. Blood will be drawn into the strip automatically by capillary action.
  4. Test result will display upon completion of the reflectance test results.

## VI. RUNNING A TEST, continued

9. For the reflectance test:

1. After applying blood to the electrochemical test strip, wipe the finger to remove any blood with a clean piece of gauze.
2. Gently, without force, apply pressure to the fingertip to accumulate a large drop of blood.  
(If venous blood is used, collect in an EDTA or heparin tube. Invert gently 5-7 times to mix completely. Immediately collect sample with glass capillary tube and dispense correct volume as specified in test strip instructions for use (package insert) onto test strip.)
3. Excessive squeezing of the finger may alter test results.
4. Use a pipet or capillary blood collector to apply whole blood to the test strip blood application window.
5. In about 2 minutes, the results will appear on the display.  
Remove and discard test strips in a biohazardous waste container

DO NOT add more blood to any test strip that has been used.

## VII. MEMORY

Test results are automatically stored in the CardioChek® Plus Professional Analyzer's memory. The analyzer can store up to 50 results of each chemistry and 10 results for control tests. The analyzer allows review of the results in order from the most recent to the oldest. Each result is displayed with time and date. Results stored in memory are not deleted when the batteries are changed.

### How to Review Results Stored in Memory

1. Press either button to turn on the analyzer. If the display reads INSTALL MEMO CHIP, go to Step 2. If the display reads INSERT STRIP, press Enter.
2. Press Next until MEMORY is displayed.
3. Press Enter. CHEM is displayed.
4. Press Enter, then Next to select the desired chemistry. (Note: Until the chemistry has been run at least once, the test name is not displayed.)
5. Press Enter to view the test result including time and date.
  1. To recall Control results, press Next until EXIT is displayed. Press Enter. Press Next until CONTROL is displayed.
  2. Press Enter when the desired Control test is displayed.
  3. For example, to review lipid panel results, from the CHEM display, press Next until LIPIDS is displayed, then Enter. The time and date will be displayed. Press Enter when the desired test time and date is displayed. Press Next to scroll through results.
6. To exit, press Next until the display reads EXIT, then press Enter. Repeat this step until you return to RUN TEST.

## VII. MEMORY, continued

### How to Clear Results Stored in Memory

1. Press either button to turn on the analyzer. Wait for the display to read either INSTALL MEMO CHIP or INSERT STRIP.
2. Press Enter, then press Next until UTILITY is displayed. Press Enter.
3. Press Next until CLEAR MEMORY is displayed. Press Enter to clear memory.
4. To exit, press Next until the display reads EXIT, then press Enter. Press Next until you return to RUN TEST.

## VIII. Wi-Fi

### Wireless Statement

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to part 1 of the FCC Rules. These limits are designed to provide reasonable protections against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. There is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

### Wireless Compatibility

- See [Section III. Setup](#) for instructions on turning Wi-Fi on and off
- Connecting to wireless requires additional setup specifications  
Contact PTS Customer Service for additional information

### Data Management

The CardioChek Plus Professional Analyzer is designed to connect to any IEEE 802.11b, 802.11g, or 802.11n network which uses the WPA Personal or WPA2 Personal network encryption schemes. The wireless module is certified by the manufacturer to be compatible with wireless networking standards established by the Wi-Fi alliance, to assure interoperability with networking equipment. Contact your IT administrator for connection assistance.

**Note:** If unable to run a test, wireless communication and patient ID lock may be on. You will see a Wi-Fi symbol flashing. To run a test, send a new patient ID to the analyzer, turn off wireless communication or press and hold both buttons on your analyzer to override the patient ID lock.

## IX. CARE AND CLEANING

### Storage and Handling

- Handle the CardioChek® Plus professional analyzer with care; do not drop
- Do not store or operate the analyzer in direct light, such as sunlight, spotlight, under a lamp, or by a window
- Do not expose the analyzer or any of the supplies or accessories to high humidity, extreme heat, cold, dust, or dirt. The analyzer may be stored at a temperature of 50-104° F (10-40° C) and 20-80% Relative Humidity (RH). **Do not freeze**
- Do not scratch or damage the surface of the check strip
- Please read the test strip package insert for storage and handling information that applies to each test strip

### Cleaning and Disinfection

Cleaning and disinfection of devices that come in contact with blood or blood products is critical to avoid transmitting bloodborne pathogens between patients and healthcare professionals.

**IMPORTANT SAFETY INSTRUCTIONS:** It is critical to properly clean and disinfect devices that are used with blood products each time it is used, between each patient. Additionally, to avoid transmissions of bloodborne pathogens, only use auto-disabling single-use lancing devices. Please see references at the end of this section for further information.

## IX. CARE AND CLEANING, continued

**Frequency:** Always clean after each use. Always clean and disinfect before storing and between each patient test. Please read the disinfectant manufacturer's product label.

**Recommended Disinfectant:** Super Sani-Cloth® wipes or any disinfectant with the same EPA Reg. No. (EPA Reg. No.9480-4, Professional Disposables International, Inc. (PDI), Orangeburg, NY). The active ingredient in this disinfectant are n-Alkyl dimethyl ethylbenzyl ammonium chlorides. Super Sani-Cloth was tested and found to be effective per recommended guidelines when used with this system. Please only use this disinfectant. Use of other disinfectants may cause damage to your analyzer. Do not use bleach, peroxide, or window cleaners on this analyzer. If you have any questions or need to know where to purchase the disinfectant wipes, call PTS Customer Service at +1-877-870-5610 (US) or +1-317-870-5610. There are a large number of distributors of this disinfectant. If you cannot obtain from the distributor who supplies your other supplies, Please contact us for assistance.

The entire case surface should be cleaned and disinfected,



- A) Screen
- B) Buttons
- C) Optical Block and Glass
- D) MEMo Chip Port
- E) USB Port
- F) See B
- G) Electrochemical Port

### ***Cleaning Instructions***

Cleaning removes visible soil, organic material, and most importantly, blood products. Always clean before disinfecting.

1. Please see picture above. Clean and disinfect all surfaces of this analyzer.
2. Obtain recommended wipes.
3. Using a fresh wipe, wring out excess liquid and carefully wipe to clean.
4. Allow to air dry or dry with cotton gauze.

## IX. CARE AND CLEANING, continued

### *Disinfection Instructions*

**After cleaning, the next step is to disinfect. Always both clean and disinfect.**

1. Using a fresh wipe, wring the wipe to remove excess liquid and wipe all areas thoroughly.
2. Keep area wet for 2 minutes to ensure disinfectant remains in contact for a sufficient time to kill all bloodborne pathogens.
3. Allow to air dry completely. **Note:** It is important that the analyzer be thoroughly dry before using.
4. The optical glass (C in picture) should be carefully wiped clean with an alcohol wipe and dried with gauze to remove any residue from the disinfectant.
5. Inspect the glass and ensure it is clean when held at different angles. If it is not, repeat Step 4.

Following cleaning and disinfection inspect the analyzer for the following signs of deterioration. These include:

- Scratching on optical glass
- Etching on optical glass
- Liquid under optical glass
  - liquid intrusion, or
  - condensation
- Loss of adhesion on optical glass
- Liquid under display lens
- Loss of adhesion on display lens
- Deterioration of painted surfaces (polymer crazing, cracking, swelling, softening, peeling, etc.)
- Any loose parts

Stop using the analyzer and contact Customer Service for a replacement analyzer immediately if you notice any signs of deterioration.

If you have any questions, call PTS Customer Service.

+1-317-870-5610 (Direct)

+1-877-870-5610 (Toll-free inside the US)

+1-317-870-5608 (Fax)

Email: [inforequest@ptsdiagnostics.com](mailto:inforequest@ptsdiagnostics.com)

Website: <http://www.ptsdiagnostics.com>



## IX. CARE AND CLEANING, continued

**IMPORTANT:** Keep area wet with disinfectant for two minutes. **DO NOT** soak, saturate, or immerse the analyzer or allow liquid to collect on any surface. Always make sure the analyzer is dry before use.

After disinfection, users' gloves should be removed and hands should be thoroughly washed with soap and water before proceeding to the next patient.

The Cardiochek Plus Professional Analyzer has been validated for 11,001 cleaning and disinfection cycles. Please obtain a new analyzer after cleaning and disinfecting the analyzer 11,001 times or once the lifetime of the analyzer (5 years) has been reached, whichever comes first.

### *References:*

1. "FDA Public Health Notification: Use of Fingertick Devices on More than One Person Poses Risk for Transmitting Bloodborne Pathogens: Initial Communication" (2010) <http://www.fda.gov/MedicalDevices/Safety/AlertsandNotices/ucm224025.htm>
2. "CDC Clinical Reminder: Use of Fingertick Devices on More than One Person Poses Risk or Transmitting Bloodborne Pathogens" (2010) <http://www.cdc.gov/injectionsafety/Fingertick-DevicesBGM.html>
3. *Biosafety in Microbiological and Biomedical Laboratories (BMBL) found at <http://www.cdc.gov/biosafety/publications/bmb15/> "Protection of Laboratory Workers From Occupationally Acquired Infections; Approved Guideline-Third Edition" Clinical and Laboratory Standards Institute (CLSI) M29-A3.*

## X. TROUBLESHOOTING

MESSAGE or ISSUE	PROBABLE CAUSE	WHAT TO DO
Desired language is not displayed.	Language has been set incorrectly.	Turn analyzer off. See <a href="#">Section III. Setup – How to Reset the Language.</a>
The wrong date and/or time is displayed.	Date and time have not been set correctly.	See <a href="#">Section III. Setup – How To Set the Date and Time.</a>
FAILED is displayed during a check strip test.	Analyzer needs to be cleaned. Check strip is dirty or damaged.	Wipe the test strip slot with a clean, damp, and lint-free cloth. Use spare check strip. If check strip still fails, call Customer Service.
TOO MUCH LIGHT	Test is being performed in direct light or outside.	Test inside, away from windows, and away from direct lamp light.
MEMO CHIP ERROR	MEMo Chip <sup>®</sup> is defective.	Use another MEMo Chip from the same lot.
TEST ERROR	Insufficient sample has been added to test strip.	Test again with a new test strip and make sure the correct volume of sample is used.
LANGUAGE	Analyzer is new or language option has not been set.	Follow user guide instructions to set language.
TEST NOT ALLOWED	Test selected by MEMo Chip installed cannot be run on your analyzer.	Check MEMo Chip and make sure that the correct MEMo Chip is inserted. Call Customer Service.
LOW TEMP	Analyzer is below acceptable operating temperature.	Move to warmer environment and test after analyzer reaches proper temperature.
HI TEMP	Analyzer is above acceptable operating temperature.	Move to acceptable environment and test after analyzer reaches proper temperature.

## X. TROUBLESHOOTING, continued

MESSAGE or ISSUE	PROBABLE CAUSE	WHAT TO DO
INSTALL MEMO CHIP	MEMo Chip is not properly inserted or is defective.	Insert same or new MEMo Chip properly.
EXPIRED LOT	Test strips are expired, wrong MEMo Chip is inserted, or date is not set properly.	Check test strip expiration date and make sure correct MEMo Chip is inserted. Check date setting – see <a href="#">Section III., Setup – How To Set the Date and Time.</a>
REPLACE BATTERIES	Batteries need to be replaced.	Replace all batteries with new high-quality AA batteries. (The analyzer will not run tests until batteries are replaced.)
TEST ABORTED	Test strip was not properly inserted or was removed before test was complete.	Test again with a new test strip.
PRINT ERROR	Print function has been interrupted.	Print result in MEMORY or test again.
Results will not print.	<p>Communication Cable was improperly connected.</p> <p>Printer cover is not closed properly. (Printer indicator light is red.)</p> <p>Labels/paper were not loaded in the printer.</p>	<p>Check all connections. Reprint test results stored in memory.</p> <p>Close printer cover correctly, ensuring that the printer indicator light is green. Reprint test results stored in memory.</p> <p>See Printer System Setup/Operating System Instruction Sheet packaged with the printer.</p>
STRIP ERROR	MEMo Chip is defective.	Use another MEMo Chip from the same lot.
INSUFFICIENT SAMPLE	Sample size was not large enough to complete testing and get result(s).	Repeat test(s) using proper sample amount(s).
STRIP REMOVED	Test strips were removed during testing.	Repeat test(s) without removing test strip(s) until results are displayed.

## XI. INTERPRETING RESULTS

All test results must be assessed by a qualified medical professional. Depending on the analyte being assessed, high or low results may have medical consequences.

If the result reads > (greater than) or < (less than) or results are not as expected, always repeat the test correctly with a new unused test strip. If a test result is displayed that is not expected, consult the following table.

MESSAGE or ISSUE	PROBABLE CAUSE	WHAT TO DO
A displayed result reads < (less than) a value.*	Result is below the measuring range of the test.	Repeat the test. Run controls and confirm that controls are in range.
A displayed result reads > (greater than) a value.**	Result is above the measuring range of the test.	Repeat the test. Run controls and confirm that controls are in range.
Display reads " _ _ _ _ " or N/A.	Result is not available due to a missing value from a calculation, or a value is outside the measuring range.	Repeat the test. Run controls and confirm that controls are in range.
TRIGS TOO HIGH LDL N/A	Lipid panel test triglycerides result was 400 mg/dL (4.52 mmol/L) or greater.	No action needed. LDL will not be calculated on samples with triglycerides of 400 mg/dL (4.52 mmol/L) or greater.

\* For example, the lower measuring ranges for PTS Panels glucose is 20 mg/dL. For lipid panel, the lower limits are: Chol 100 mg/dL, HDL 15 mg/dL, Trig 50 mg/dL.

\*\* For example, the upper measuring ranges for PTS Panels glucose is 600 mg/dL. For lipid panel, the upper limits are: Chol 400 mg/dL, HDL 100 mg/dL, Trig 500 mg/dL.

## XII. CLIA INFORMATION

### General CLIA Information (US Only)

(Please read before testing)

1. CLIA-waived. Each laboratory or testing site using the PTS Panels® test strips MUST have a CLIA Certificate of Waiver (or other CLIA operating license) before testing. To obtain a Certificate of Waiver or any other type of laboratory license, call your state health department or PTS, Inc. at +1-877-870-5610 (Toll-free) or +1-317-870-5610 for an application (form CMS 116).
2. Before you start testing, carefully read all instructions, including quality control. Failure to follow instructions, including quality control instructions, will result in high complexity rating and subject the facility to all applicable CLIA requirements for high complexity testing. For complete information including performance, please refer to the product specific package insert and user guide. The glucose and lipid panel test systems are currently CLIA waived. The original CLIA waiver was under the analyzer name BioScanner Plus.
3. CLIA-waived for whole blood (fingerstick and venous EDTA or heparin) testing only.

## XIII. SPECIFICATIONS

### **CardioChek® Plus Professional Analyzer**

Calibration Curve: Input from MEMo Chip® per test strip lot

Batteries: (4) AA 1.5 volt alkaline

Operating Temperature Range: 50-104°F (10-40°C)

Humidity Range: Between 20 and 80% RH

Dimensions:

Width: 3.2 in (8.13 cm)

Length: 6.0 in (15.24 cm)

Height: 1.5 in (3.8 cm)

Weight: (without batteries): ~5.5 oz. (~156 g)

### **PTS Panels® Test Strips**

Please read the instructions (package insert) included with the test strips for information specific to each chemistry.

### **Optional CardioChek Printer/Power Supply**

For complete details, refer to each printer's user guide.

## XIV. CONTACT INFORMATION

### Help

For assistance with the CardioChek Plus test system, please contact PTS Customer Service (M-F, 8 a.m.--5 p.m. US EST) or your local authorized CardioChek dealer.

### **Polymer Technology Systems, Inc.**

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+1-317-870-5610 (Direct)

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Email: [inforequest@ptsdiagnostics.com](mailto:inforequest@ptsdiagnostics.com)

Website: <http://www.ptsdiagnostics.com>

## XV. WARRANTY

### **CardioChek Plus Professional Analyzer Limited Two-Year Warranty**

PTS, Inc. warrants to the original purchaser only, that the CardioChek<sup>®</sup> Plus Professional Analyzer shall be free of any defects in materials or workmanship for a period of two years from the date of original purchase. Activation of this warranty shall be conditioned upon completion and return of the warranty registration card to PTS, Inc. If the analyzer becomes inoperative during this time, PTS, Inc. will replace the analyzer with equivalent analyzer, at its option, at no cost to the purchaser. The warranty becomes void if the analyzer is modified, improperly installed or operation not in accordance with the user guide, damaged by accident, or neglect, or if any parts are improperly installed or replaced by the user.

**Note:** Removing or loosening screws from the back of the analyzer voids all warranties. There are no user serviceable parts inside the case.



## XVI. EXPLANATION OF SYMBOLS

### Symbols



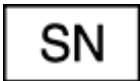
Consult Instructions for Use



Temperature Limitation



In vitro diagnostic medical device



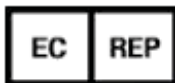
Serial Number



Manufacturer



Catalog Number



Authorized Representative in the European Community



This product fulfills the requirements of the European Directive 98/79 EC for in vitro diagnostic medical devices.



Product requires separate collection for electrical and electronic equipment per the WEEE Directive



Federal Communications Commission

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The CardioChek® brand analyzers and associated test strips may be covered by one or more of the following patents:

U.S. Patent Nos. 7,435,577, 7,625,721, 7,087,397, 7,214,504, 7,374,719, 7,494,818, 5,597,532, and D534444

Australian Patent No. 2002364609

Eurasian Patent No. 010414

Mexican Patent No. 267323

South African Patent Nos. 2004/4929 and 2006/06561

EP Patent No. 0750739 (DE, FR, GB, IT)

Other patents pending.

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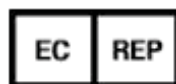
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