

***EasyLyte***<sup>®</sup> C series

Service Manual

**Na/K**

**Na/K/Cl**

**Na/K/Li**

**Na/K/Cl/Li**

**Na/K/Cl/Ca**

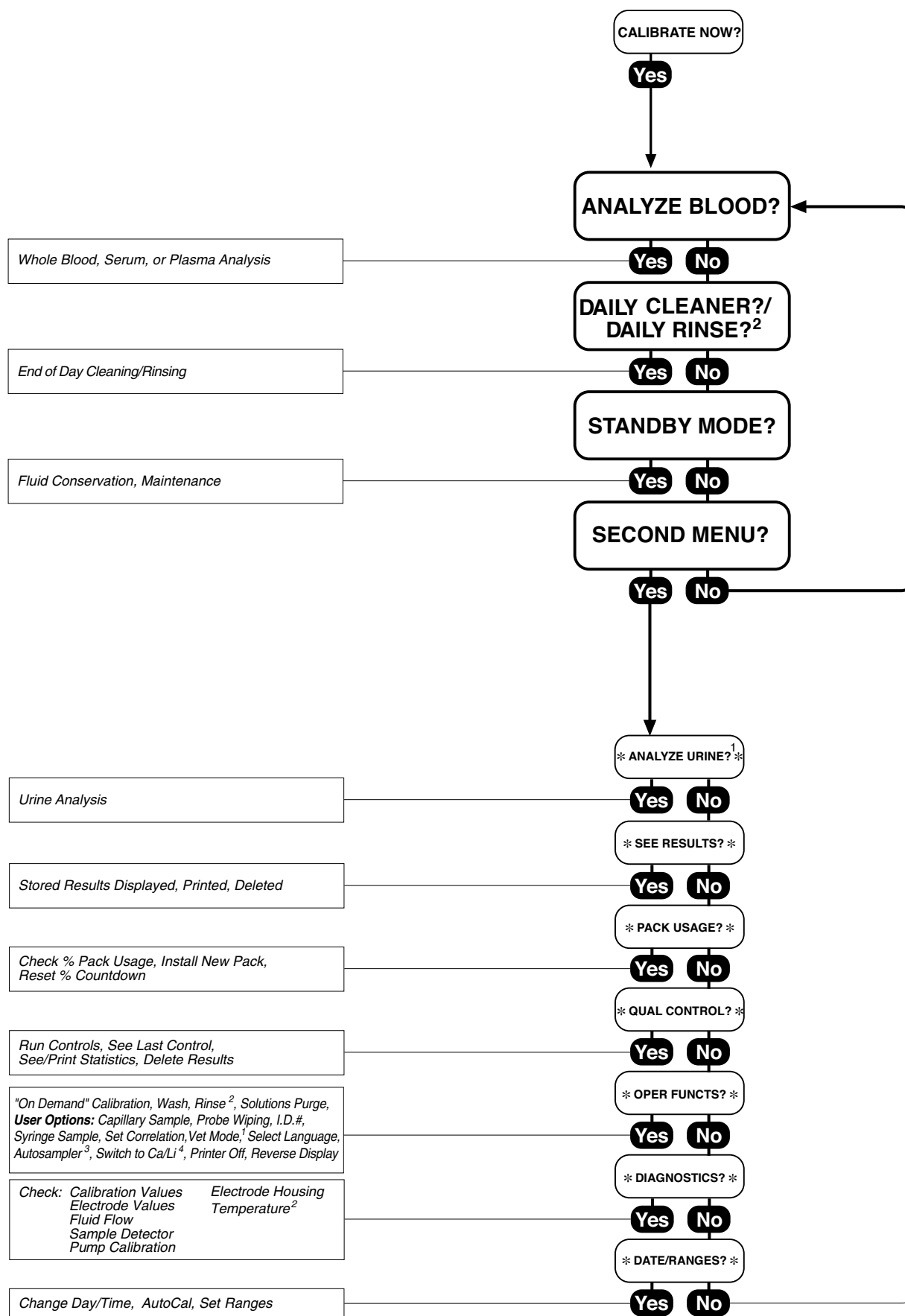
**Na/K/Ca/pH**

analyzers

CE

**MEDICA**

## Flow Chart



<sup>1</sup> Not available for Na/K/Ca/pH analyzer

<sup>2</sup> Na/K/Ca/pH only

<sup>3</sup> Na/K, Na/K/Cl, Na/K/Li only

<sup>4</sup> Na/K/Cl/Li or Na/K/Cl/Ca only

# **MEDICA**    ***EasyLyte***<sup>®</sup> C series

## Service Manual

**REF** 2288

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The Medica EasyLyte analyzer is for *In Vitro* Diagnostic Use.



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The information in this manual was correct at the time of printing. However, Medica Corporation continues to improve products and reserves the right to change the specifications, equipment, and maintenance procedures at any time without notice.

If the Analyzer is used in a manner other than as specified by Medica Corporation, the protection provided by the equipment may be impaired. See warnings and hazard statements.

# Preface

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This Service Manual will assist you in repairing the EasyLyte analyzer.

## Symbols used throughout the manual



Important information



Conditions which may cause data loss or analyzer malfunction



Biohazard warning



Possible electrical hazard to the operator.

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# Product Overview

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The EasyLyte analyzer is a direct measurement ion-selective electrode (ISE) system which uses Sodium (Na), Chloride (Cl), Potassium (K), Lithium (Li), Calcium (Ca) and pH sensitive components to measure electrolytes in either whole blood, serum, plasma or urine (lithium values not reported for urine). Urine results are available for Na/K, Na/K/Cl, Na/K/Li and Na/K/Cl/Ca/Li analyzers only.

The analyzer software allows the operator to perform sample analysis, analyzer diagnostics and maintenance by simply pressing the "YES" or "NO" buttons in response to prompts displayed on the LCD screen. The EasyLyte analyzer performs the analysis both quickly and cost effectively. Analysis takes only one minute and utilizes approximately one hundred microliters of whole blood, serum or plasma; or four hundred microliters of diluted urine.

The analyzer can re-calibrate automatically every four hours and can perform emergency (STAT) analysis on demand. Results are always displayed on the LCD screen and can also be documented on paper by an integrated printer.

The analyzer contains a patented reagent system including a modular solutions pack. This pack also serves as a waste receptacle for solution and samples after analysis.

## System Overview

The EasyLyte analyzer is engineered to make local service feasible. Modular construction is used throughout the design. The basic operating system consists of a motor which drives a peristaltic pump. The peristaltic pump pulls the desired fluid through the system, disposing waste into a designated compartment inside the solutions pack. A second motor drives a lead screw which in turn drives a mechanical link-arm assembly. This link-arm assembly moves the sample probe vertically allowing the probe inside the solutions valve to aspirate the appropriate fluid for pumping: sample; standards; or air. The sample detector in the fluid line positions the fluids.

Please note that mechanical and electrical assemblies can be replaced. Follow the instructions in the Troubleshooting section to determine if assembly replacement is necessary. Refer to the Replacement List in this section which lists replaceable assemblies, components, and appropriate catalog numbers.

If repair to any electrical assembly is necessary, consult Schematics in the Appendix for further detail. Service personnel are encouraged to contact Medica directly with any problems or concerns relating to electrical assemblies.

## Front Assembly Components

This section describes the main assemblies and components of the EasyLyte front assembly. Refer to Figures P1, P2, and P3 for the location of each component.

**Front Housing** front case of the analyzer

**Power Supply** Assembly powers the analyzer

Entry Module connection for the power cable

Fuse Bay holds 2 fuses

Power Supply Cable connects the power supply to the CPU assembly

**CPU Assembly** contains the CPU board with digital components and analog sensor inputs

Firmware (EPROM) contains the software

Interface Ports for EasySampler and RS-232 for serial devices

**Display Assembly** shows EasyLyte prompts/results on LCD screen

LCD Screen

Display Cable connects the display and Yes/No switch PCB to the CPU assembly

Sample Detector Cable connects the sample detector to the Yes/No switch PCB board

**Pump Assembly** peristaltic pump to move fluids through the analyzer

Pump Motor powers pump

Pump Head Assembly contains pump body, rollers

Pump Motor Cable connects the pump to the CPU assembly

**Probe Motor Assembly** moves the probe arm

Probe Motor with Lead Screw powers lead screw

Mounting Bracket holds probe lead screw motor assembly in place

Probe Position Sensor positions the probe position scale

Sensor Cable connects the probe position sensor to the CPU assembly

Probe Position Scale positions the probe arm

Probe Motor Cable connects the motor to the CPU assembly

**Printer Assembly** prints a hard copy of analysis, diagnostics or maintenance results

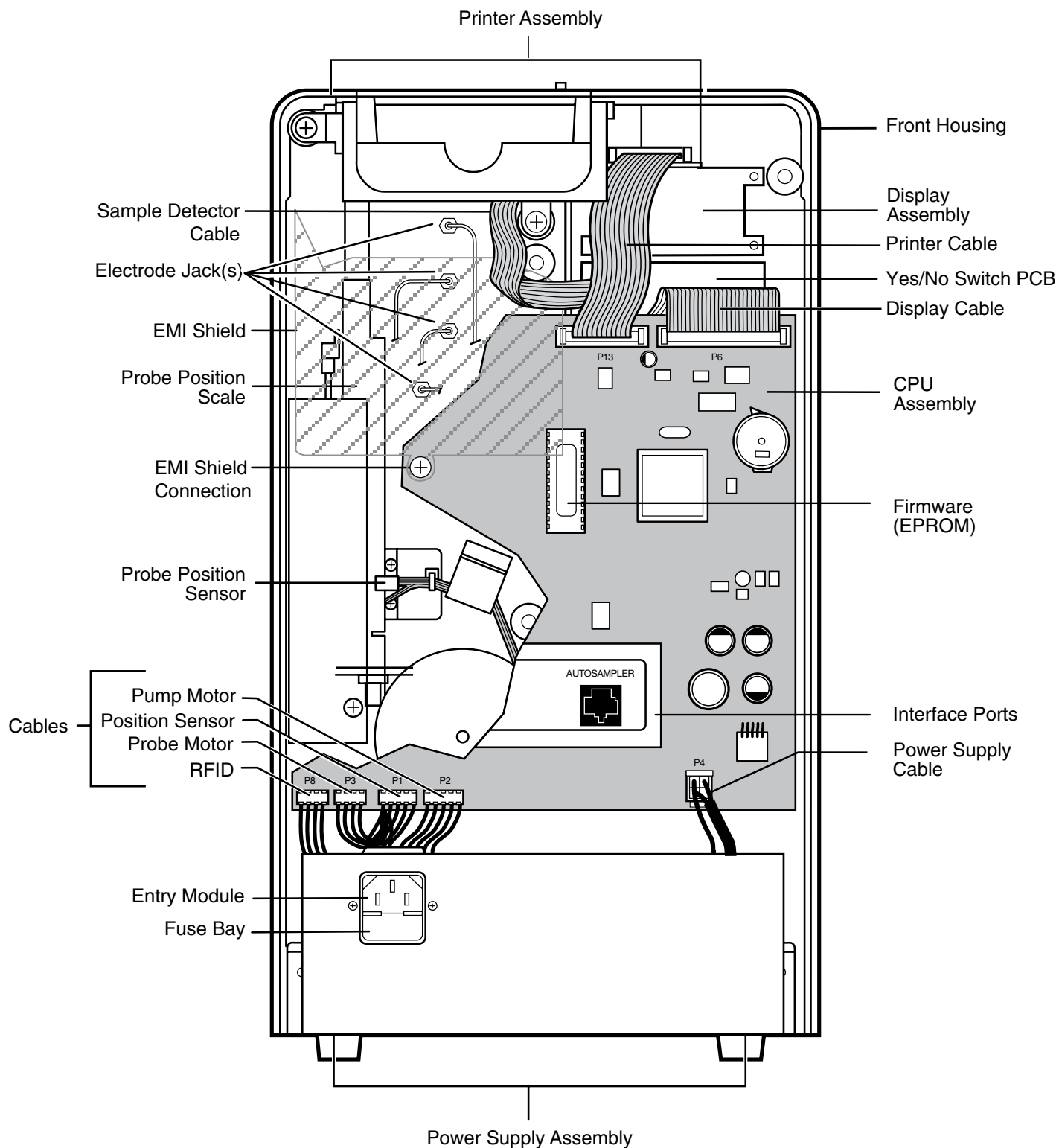
Printer Cable connects the printer to the CPU assembly

**Probe Arm** holds and moves the probe to aspirate samples and calibrants

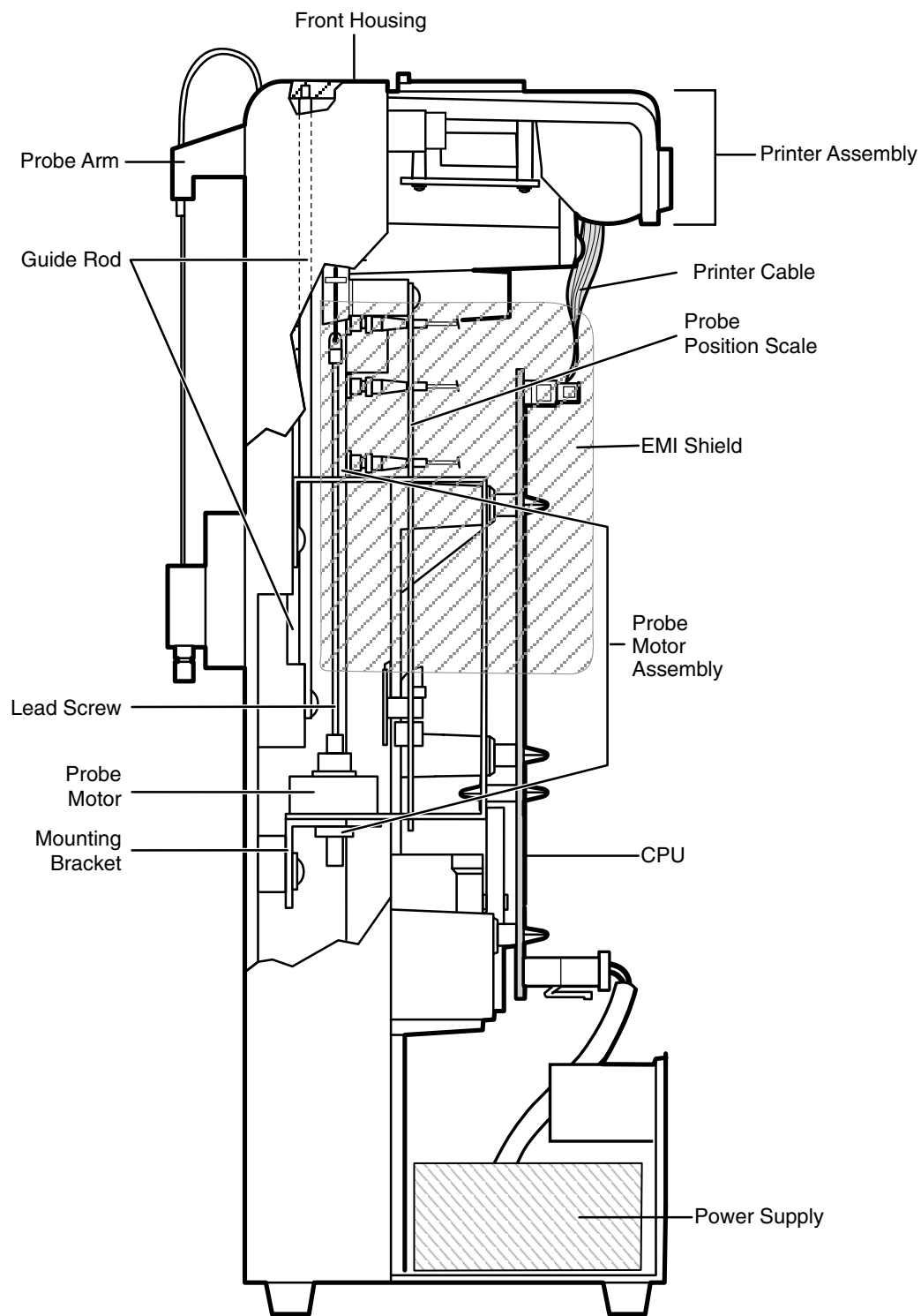
Guide Rod allows probe arm to move vertically

**Electrode Jack(s)** connects electrodes to the CPU assembly

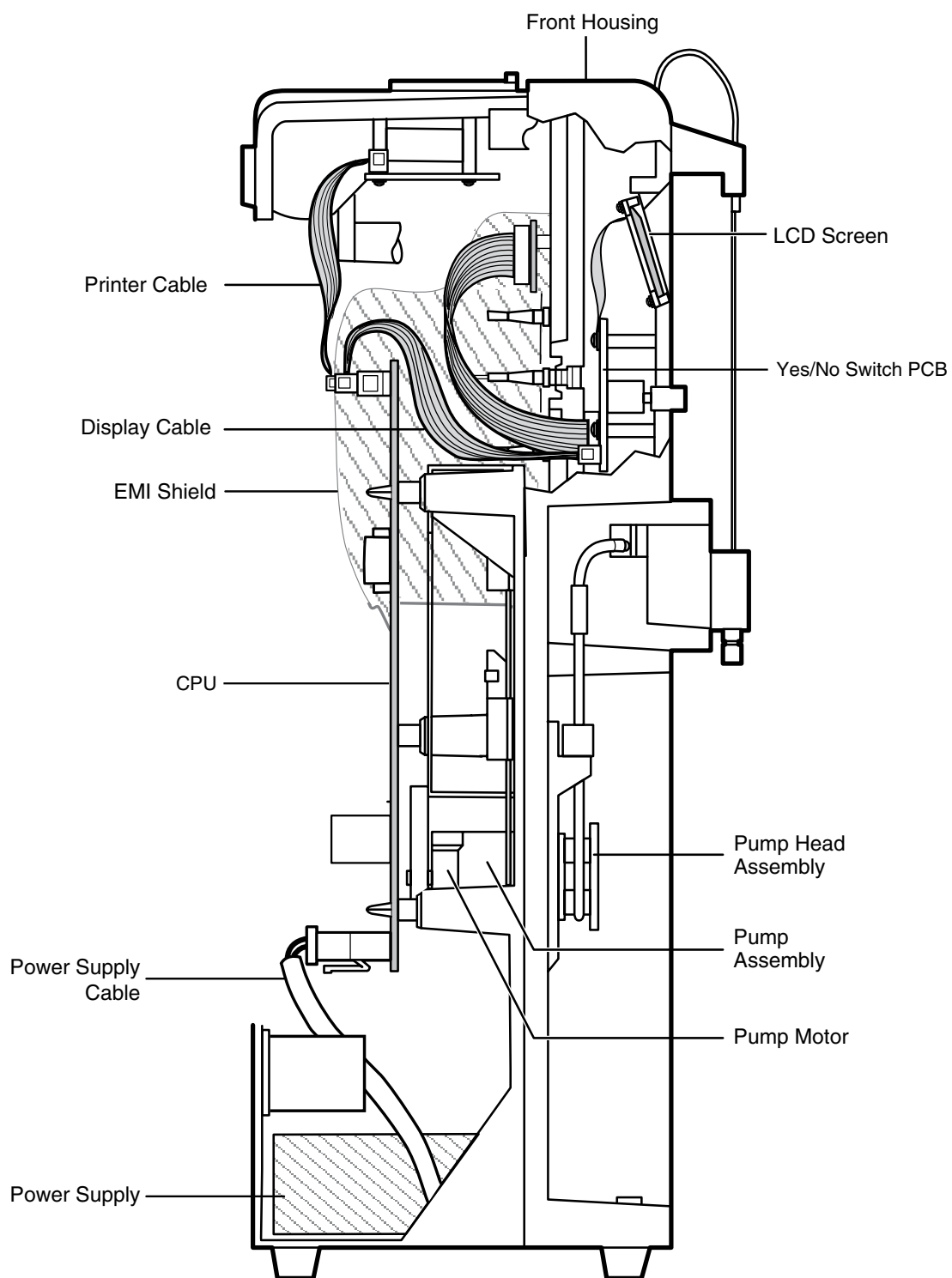
**RFID CPU** sends pack size and configuration of solutions pack



**Figure P1 Front Assembly - Back View**



**Figure P2 Front Assembly - Right Side View**

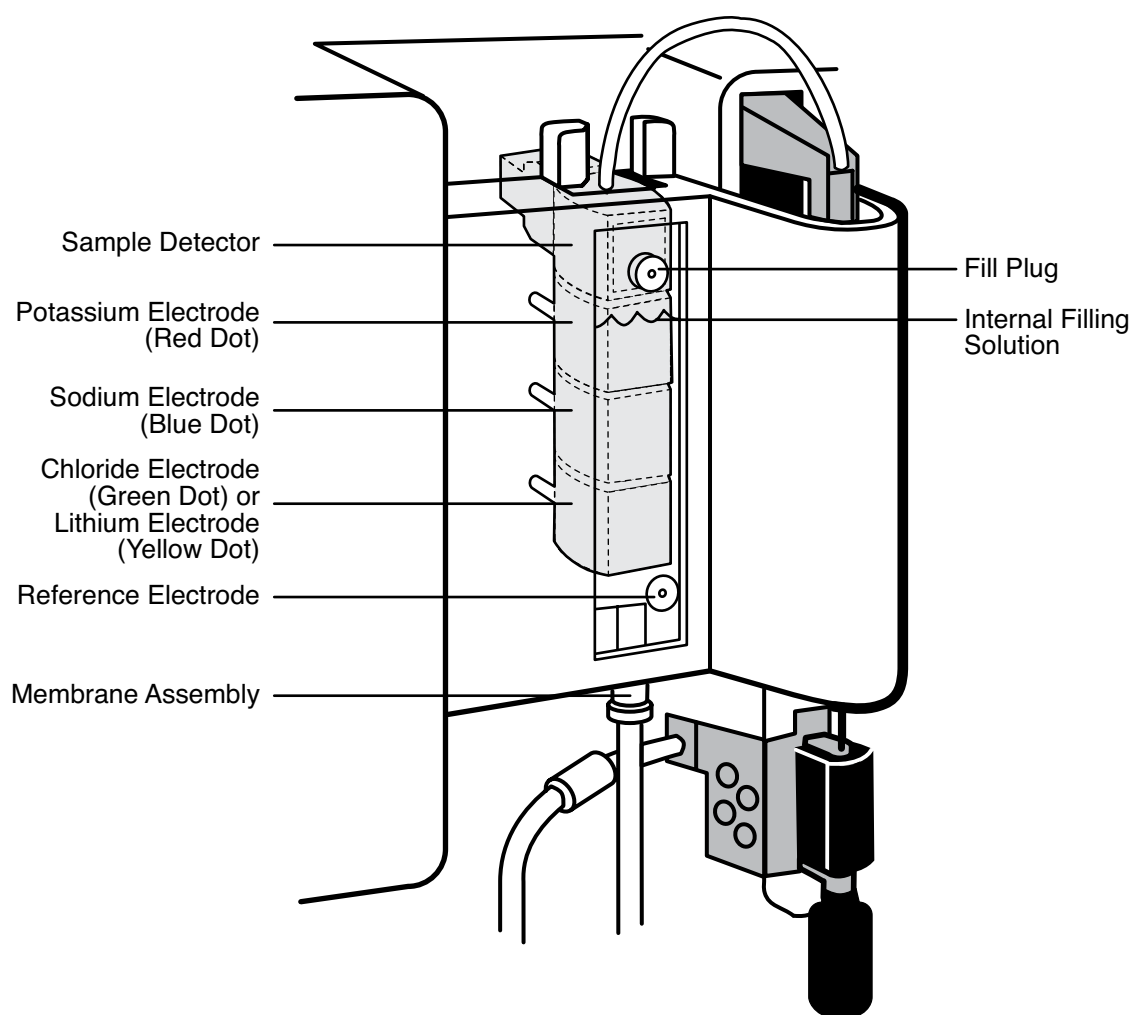


**Figure P3 Front Assembly - Left Side View**

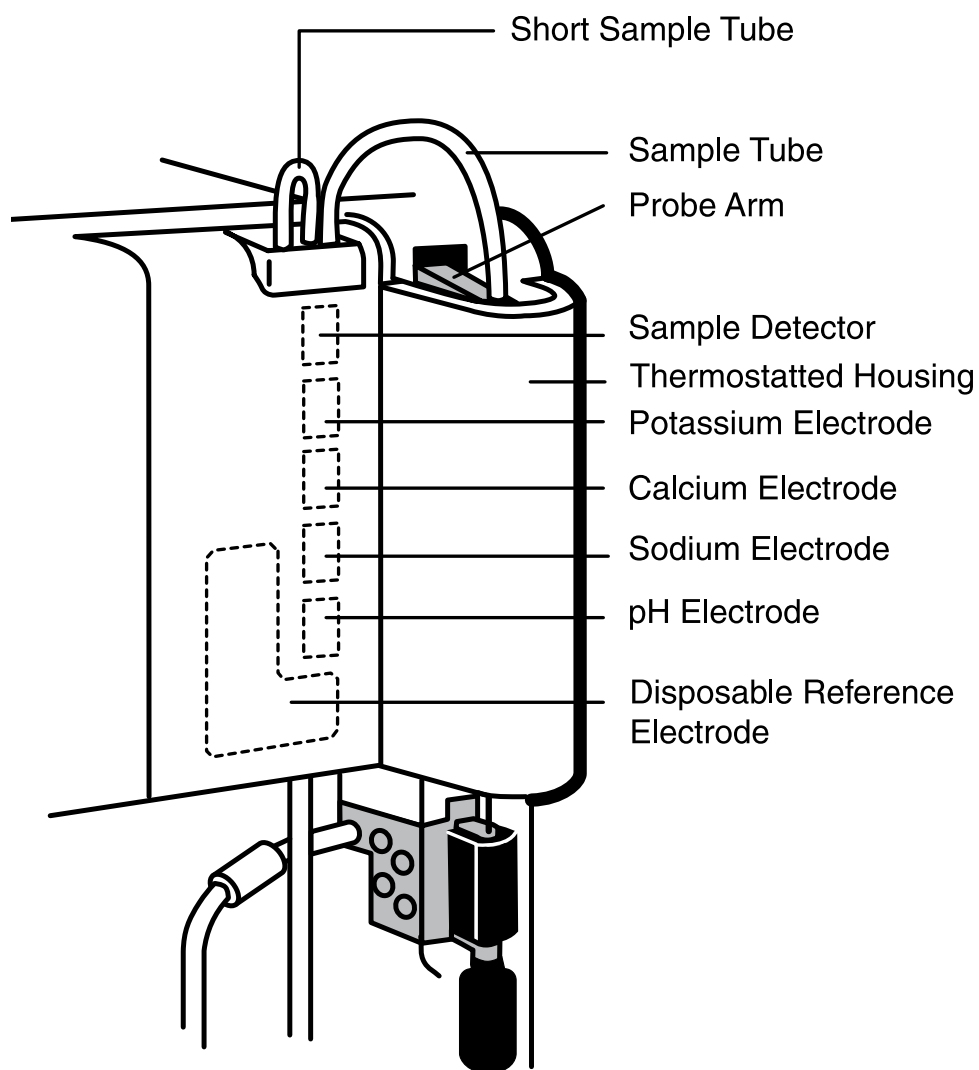
## Electrode Housing Assembly Components

This section describes the components of the EasyLyte electrode assembly. Refer to Figures P7, P8 and P9 for the location of each component.

- Electrodes sodium, potassium, chloride, lithium, reference
- Sample Detector detects presence of air/liquid, sets sample position inside electrodes
- Internal Filling Solution 2 molar KCl solution, acts as 'salt bridge' with reference electrode
- Fill Plug prevents the internal filling solution from evaporating
- Membrane Assembly connects reference electrode with other electrodes

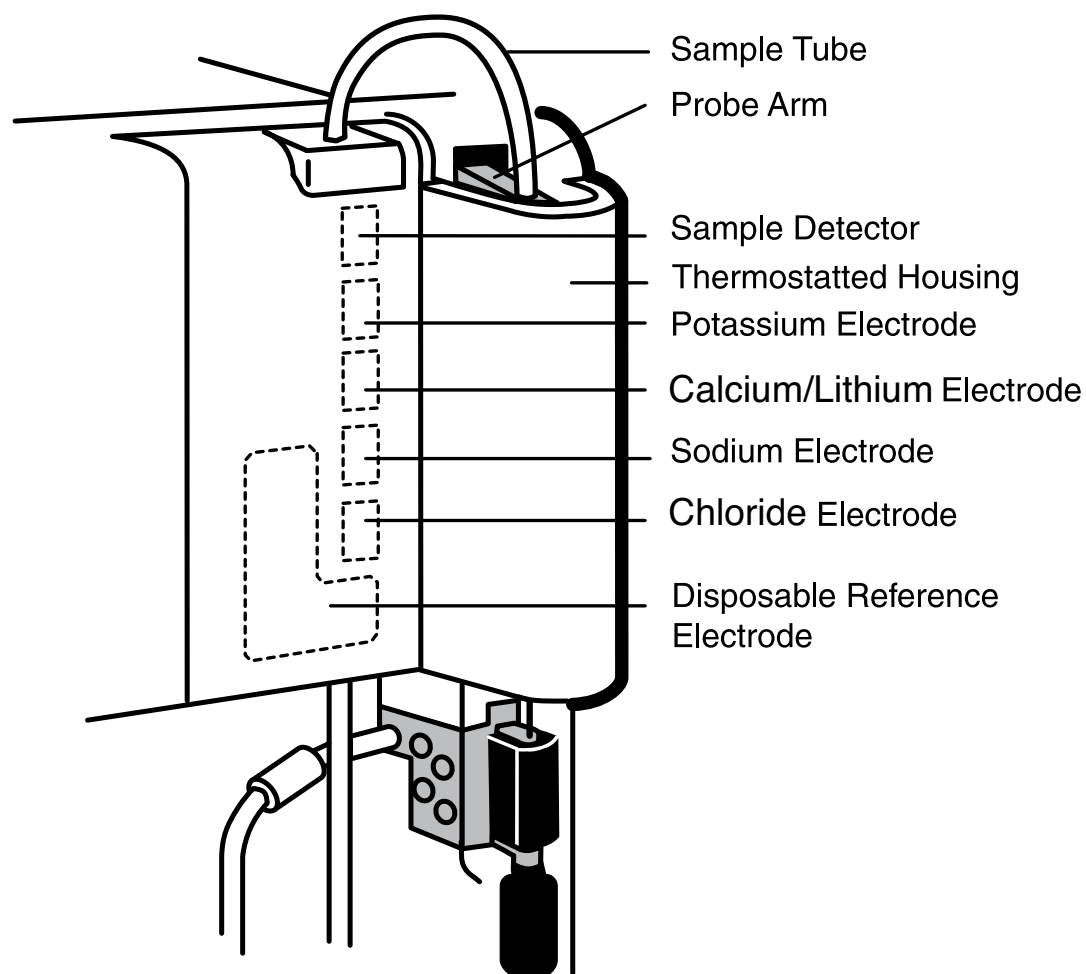


**Figure P7 - Electrode Housing Assembly Na/K/Cl or Li**



**Figure P8 - Electrode Housing Assembly Na/K/Ca/pH**

- Contains a thermostatted housing
- Includes a pre-heated short sample tube
- Disposable Reference Electrode eliminates the need for Membrane Assembly, Fill Plug and Internal Filling Solution



**Figure P9 - Electrode Housing Assembly Na/K/Cl/Ca or Li**

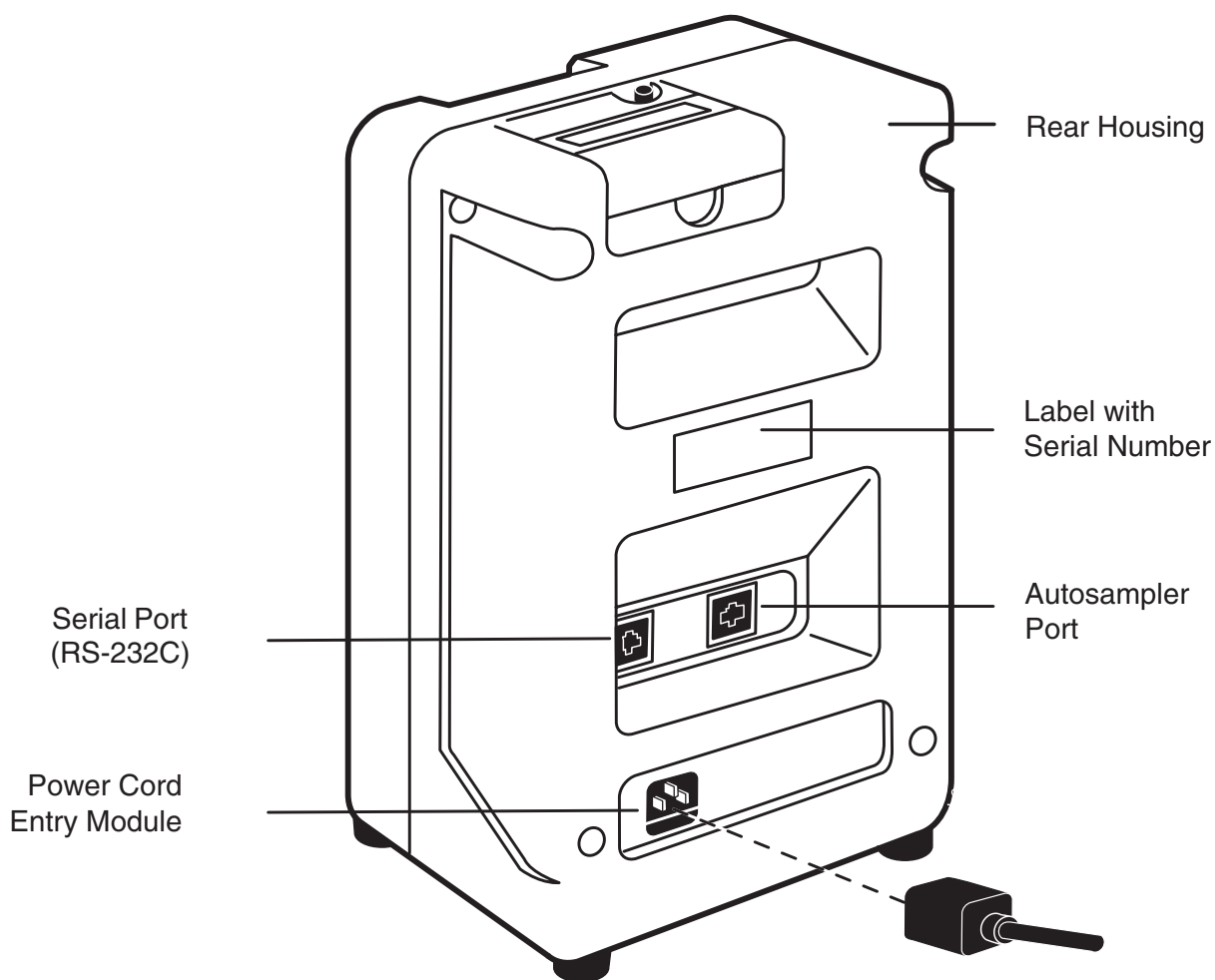
- Disposable Reference Electrode eliminates the need for Membrane Assembly, Fill Plug and Internal Filling Solution



## Rear Assembly Components

This section describes the components of the EasyLyte Rear Assembly. Refer to Figure P9 for the location of each component.

- Rear Housing rear case
- Label identifies serial number



**Figure P10 - Rear Assembly**

# Troubleshooting

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## Troubleshooting Overview

This section describes troubleshooting the mechanical and electrical functions of the EasyLyte analyzer. This section is based on the principle of replacing suspected faulty assemblies with new assemblies. Medica recommends keeping an inventory of functioning test assemblies for troubleshooting the EasyLyte. Refer to the Troubleshooting Guide in this section to determine the cause and corrective action that must be taken to properly service the EasyLyte Analyzer.

For information on troubleshooting the EasyLyte Analyzer flow system and consumable items, consult the EasyLyte Operator's Manual. See the Replacement List in the Product Description section of this manual for a complete listing of all consumable items and catalog numbers. For information on troubleshooting the EasyLyte EasySampler consult Troubleshooting in the EasySampler section.

## Troubleshooting Guide

Refer to the chart below to help determine the problem and corrective action needed.

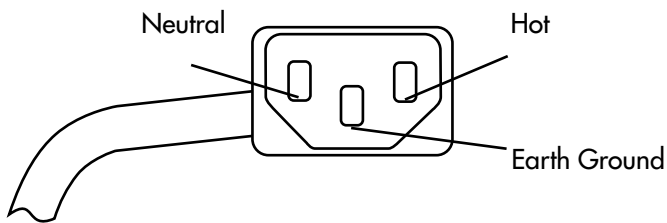
Problem Description	Problem Source	Corrective Action Steps
Blank Display	Power Malfunction or Defective Display	<ul style="list-style-type: none"><li>• AC Power Verification</li><li>• DC Power Verification</li><li>• Display Verification</li></ul>
No response to YES/NO buttons	Power Malfunction or Defective Display	<ul style="list-style-type: none"><li>• Display Assembly Verification</li><li>• DC Power Verification</li></ul>
Blank Display, Beeping	Faulty EPROM Installation or Power Malfunction	<ul style="list-style-type: none"><li>• Inspect EPROM Installation</li><li>• DC Power Verification</li></ul>
"MTS" Errors	Probe Motor Malfunction	<ul style="list-style-type: none"><li>• Probe Motor Verification</li></ul>
"MTP" Errors or No Pump Movement	Pump Motor Malfunction	<ul style="list-style-type: none"><li>• Perform PUMP CAL test in DIAGNOSTICS? Menu</li><li>• Pump Motor Verification</li></ul>
Printer Does Not Print	Printer Malfunction	<ul style="list-style-type: none"><li>• Printer Verification</li></ul>
Sample Detector Test Failure Result 255 or Ø	Sample Detector/Circuit Malfunction	<ul style="list-style-type: none"><li>• Sample Detector Verification</li></ul>
Bad Electrode Voltages	Electrodes or Signal Input Malfunction	<ul style="list-style-type: none"><li>• Check Electrode Installation and Performance</li><li>• Signal Input Verification</li></ul>
Serial Transmission Failure	Serial Cable or Transmission Protocol	<ul style="list-style-type: none"><li>• Serial Communication Verification</li></ul>

## AC Power Verification



**WARNING:** Careless handling of AC Power, especially 220V, can be hazardous or fatal. Only qualified personnel should work with AC Power.

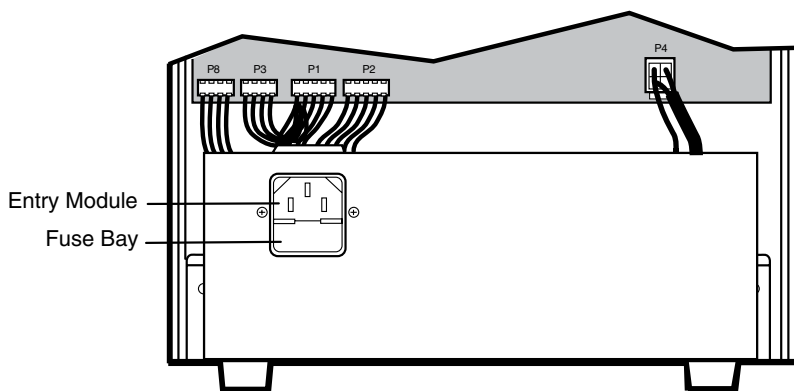
1. Unplug the power cord from the entry module and plug into the outlet.
2. Check the voltage at hot and neutral at the end of the power cord. Refer to Figure T1.



**Figure T1**

If the voltage is incorrect, replace the power cord and return to normal operation. Otherwise, proceed to Step 4.

4. Using a small flat-tip screwdriver pry open the fuse bay. Refer to Figure T2 for the location of fuse bay. Remove and inspect both fuses as follows: the fuses must be rated 0.8A, 250 Volts slow blow or time delay type fuse



**Figure T2**

Visually inspect the wire conductor inside the fuses. If the wire is broken or missing, replace the fuse. If in doubt, check for conductivity through the fuse with an ohmmeter.

5. Remove the rear housing. Refer to Rear Housing Removal in the Repair section.

6. Check for short circuits between the test points listed below:

TP8 and TP5

TP7 and TP5

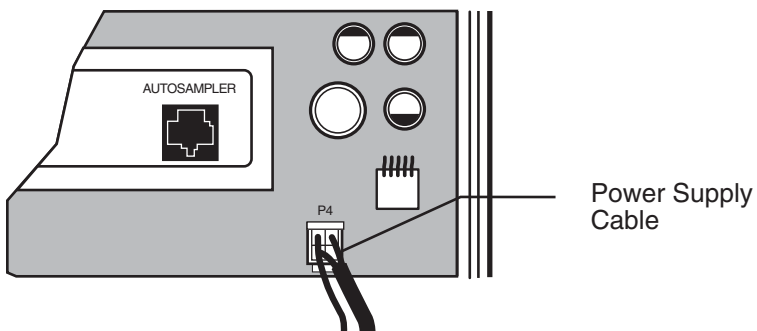
TP6 and TP5

TP14 and TP12

TP15 and TP12

If a short exists, replace the CPU board. Otherwise, return to normal operation.

7. Disconnect the Power Supply cable (4-pin connector) from the CPU board, see Figure T3. Connect the EasyLyte entry module to a wall outlet with a known good power cord.



**Figure T3**

8. Connect the reference side of the voltmeter to Pin 1 of the power supply cable (4-pin connector).

9. Check the voltage across Pins 2 and 4. The voltage should be  $24 \pm .5V$ .

10. Measure the resistance between Pin 1 and power supply chassis. The resistance should be zero. If any of the voltages are incorrect, replace the power supply module and return to normal operation.

### **DC power verification:**



1. Reconnect the power supply cable (4-pin connector) to the CPU board, see Figure T3.

2. Connect the reference side of the voltmeter to chassis of the power supply.

3. Check the DC voltages at the test points listed below. See CPU board for test point locations.

Test Point	Value	Tolerance
TP14	+5.0V	±0.15V
TP10	15V	±0.15V
TP15	24V	±0.5V
TP7	-5.0V	±0.15V
TP6	+5.0V	±0.15V
TP8	-8.0V	±0.5V
TP9	+2.5V	±.10V

If any of the voltages are incorrect, replace the CPU board and the AC power supply.

## Display Verification

1. Disconnect the display cables from the Yes/No switch PCB. See Display Assembly Removal in the Repair section for details.
2. Connect a known good display assembly to the Yes/No switch PCB and connect the main power cord. Verify that the test display is operative. Based on the test results, take the appropriate corrective action.
  - Display Blank:  
Remove the test display cable. Perform AC and DC power verification. If the AC and DC power tests are successful, replace the CPU board with a new CPU board, and return to normal operation. See CPU Assembly in the Repair section for details.
  - Display On and Yes/No buttons function:  
Remove the original display assembly and replace with a new display assembly.

See Display Assembly in the Repair section for details.

## Probe Motor Verification

1. Disconnect the power cord, wait 5 seconds, then reinstall the power. The probe arm should move down and back up. If there are no error messages, resume normal operation. If an "MTS" error occurs, proceed to Step 2.
2. Remove the sample probe from the probe arm. For details refer to EasyLyte Operator's Manual. Remove and reinstall the power cord. The probe arm should move down and back up. If there are no error messages examine and if necessary replace the sample probe, solutions valve and probe wiper. If an "MTS" error occurs, proceed to Step 3.
3. If the probe arm does not move at all perform the following operations.
  - A. Visually inspect that the actuator and retaining ring are correctly installed on the probe motor lead screw. Refer to Figure R64 in the REPAIR SECTION. If the installation is incorrect, refer to CPU Removal and Probe Motor/Lead Screw Installation in the REPAIR SECTION for details.

- B. Check that the probe motor wires are completely seated inside the 4-pin connector as follows.
  - Remove the probe motor connector from the bottom left of the CPU Board (position P3).
  - Compress the strain-relief cap against the probe motor connector to firmly seat the wires.
  - Reinstall the probe motor connector into the CPU Board.
- C. Repeat STEP 1. If no errors occur, resume normal operation.
4. If the probe arm moves and stops anywhere except the top position, or if the probe arm vibrates against the top of the EasyLyte housing, replace the probe position sensor. To replace the sensor, first remove the CPU Board and the probe position scale. Refer to Probe Motor/Lead Screw in the Repair section for details.
5. If the Probe does not move at all, check for a short circuit on the CPU Board between TP12 and TP2. If there is a short circuit, replace the CPU. See Assemblies in the Product Description section.
6. If no short circuit is found, replace the probe motor assembly. Refer to the Probe Motor Assembly in the Repair section for details.

## Pump Motor Verification

1. Enter the QC TEST? function and proceed to the PUMP TEST? Refer to QC Tests in this section for further instructions.
2. At the PUMP TEST? prompt, press YES.
3. The pump should rotate ten revolutions.
4. If the pump vibrates or does not run smoothly, ensure that the pump motor wires are properly seated inside the 6 pin connector as detailed below.
  - A. Remove the pump motor connector from the bottom left of the CPU board  
See Figure P1 in the Product Description section.
  - B. Compress the strain-relief cap against the pump motor connector to firmly seat the wires.
  - C. Reinstall the pump motor connector into the CPU board.
5. Repeat the Pump Test. If the pump malfunctions, replace the pump motor with a test motor. See Pump Motor in the Repair Section for further instructions.
6. Repeat the Pump Test with the test motor. Based on the test results, take the appropriate corrective action.
  - Motor Operative: Replace the test motor with a new motor. See Pump Motor in the Repair section.
  - Motor Malfunction: Check for a short on the CPU board between TP12 and TP2. If there is a short circuit, replace the CPU. See Assemblies in the Product Description section.

## Printer Verification

1. Press the printer paper advance button, making sure the release lever is pressed all the way down and back. If the paper advances proceed to Step 2. If the paper does not move, proceed to Step 3.
2. Verify that the printer is on. Turn the printer on by pressing NO to the PRINTER OFF? question in the User Options section.
3. If the printer is still not working, remove the power cord from the analyzer and wait for ten seconds, then install the power cord back into the entry module. Press the printer paper advance button. The paper should advance forward.
4. If the printer is still not working, remove the printer cover and check for any paper obstruction in the printer head area. Pull the print lever all the way forward to move the print head away from the carriage. Remove any obstructions if possible, without damaging the printer assembly or paper tear bar. If an obstruction cannot be removed, replace the printer assembly. Refer to Printer Removal and Installation in the Repair section for details.
5. If there are no obstructions, but the printer does not work, perform the following steps.
  - A. Remove the rear housing as detailed in the Repair section.
  - B. Remove the printer cable at the bottom right of the CPU board.
  - C. Compress the strain-relief cap against the probe motor connector to firmly seat the printer cable.
  - D. Reinstall the printer cable into the CPU Board.
6. If the printer still does not print, connect a test printer assembly to the CPU Board. If the test printer works, install a new printer assembly. If the test printer does not work, replace the CPU board. Refer to CPU Installation in the Repair section for details.

## Sample Detector Verification

1. Remove the electrode housing from the analyzer. See the EasyLyte Operators Manual for further details.
2. Remove the sample detector from the front housing.
3. Install the sample detector into the sample detector receptacle.



Do not install the electrode housing or pump tubing at this time.

4. Proceed to the DIAGNOSTICS? menu and perform the SAMPLE DETECTOR TEST?
  - With the sample detector installed, the value on the display screen should be less than 200.
  - With the test in progress, remove the sample detector. The display value should rapidly change to 255. If the sample detector test meets these specifications, resume normal operation.

A value of 255 with the sample detector installed indicates a bad connection. Proceed to Step 5 to check the sample detector circuit.
5. Reinstall the sample detector. Look at the left side of the sample detector. A red light must shine from the LED hole. If there is no red light, install a known good sample detector. If there is still no red light, replace the Display Assembly. Refer to the Repair section for information.
6. If the TEST sample detector red light is on, check the four connecting pins on the original sample detector. The pins must face straight out forming a rectangle. If the pins are bent against the black plastic body, straighten the pins using a small flat head screwdriver.
7. Reinstall the original sample detector and repeat STEP 4.
  - If the red light comes on: Reassemble the EasyLyte analyzer and perform a SOLUTIONS PURGE and a SAMPLE DET. TEST. Resume normal operation.
  - If the red light remains off: Install a new sample detector.
8. If a new sample detector does not light, replace the sample detector PCB.

## Signal Input Verification

1. Remove and inspect electrodes and electrode housing for liquid leakage and salt build-up. All electrodes and the electrode housing surfaces **MUST** be completely clean and dry. See EasyLyte Operator's Manual for further information on consumable items.
2. Inspect the electrode pin receptacles on the EasyLyte analyzer front housing. Remove any liquid or salt from these areas.
3. Enter \* DIAGNOSTICS? \* and answer YES to ELECTRODE VALUES? The display most likely will show "249 249 249".

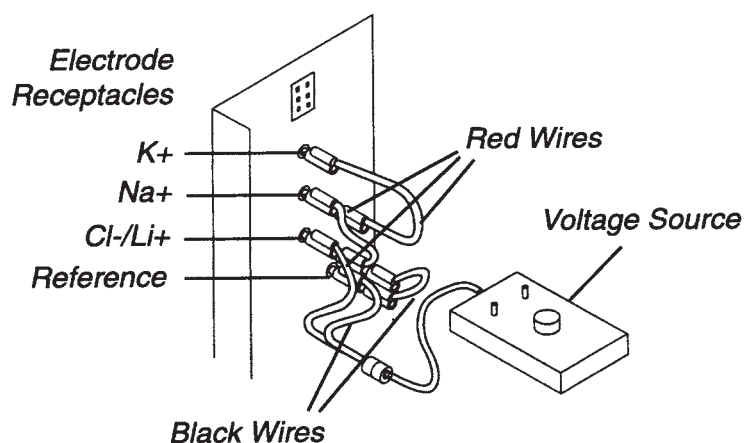


The following steps require the use of the Mini-Test High Impedance Voltage Source, part no. 001374. If this tool is not available, the remaining tests cannot be performed.

4. Connect the Voltage Source to the EasyLyte analyzer as follows. Refer to Figure T5.
  - A. Connect the three red wires from the Voltage Source to the K<sup>+</sup>, Na<sup>+</sup>, and CL<sup>-</sup>/Li<sup>+</sup> electrode receptacles
  - B. Connect the black wire from the Voltage Source to the reference electrode receptacle.



- C. Connect the remaining black wire into the back connector on the Cl-/Li+ red wire.  
This step will short out all three electrode channels.



**Figure T5**

5. Read the EasyLyte display. The electrode value specification is 0 mV to 12 mV.
6. Disconnect the black wire from the back connector on the Cl-/Li+ red wire.
7. Turn on the Voltage Source.
8. Set the Voltage Source to the group 1 settings listed in the table below. Three new individual values will appear on the screen. Wait a few seconds for the values to stabilize then verify that the values are within specification. Press Yes to print the values.
9. Set the Voltage Source to the group 2 settings, listed in the table below, and repeat STEP 8.
10. Calculate the difference between the group 1 values and group 2 values. Verify that the values are within specification.

Settings	Group 1	Group 2
Polarity setting	acid (positive)	acid (positive)
Impedance setting	HI	HI
Offset setting	8-6pH	10-4 pH
<b>Voltage Values</b>		
Individual values	59 mV ± 10mV	177 mV ± 10 mV
Difference between group 1 and 2	118 mV ± 3 mV	

11. If any of the voltage values are out of specification, examine the electrode jacks for corrosion and verify the connection between the electrode jack and CPU board. Refer to Electrode Jack Removal in the Repair section. If the electrode jacks are not corroded and are properly connected, replace the CPU board with a new CPU board. See CPU Assembly in the Repair section for details.
12. Turn off the Voltage Source.

▲ If the technician has any questions about the reliability of the mini-tester, install a new 9 volt battery and repeat the above procedure.

## Serial Communication Verification

1. Connect the EasyLyte analyzer to a device with a known working serial port. Use a known good EasyLyte serial cable. To connect to a 9-pin Sub-D serial connector, use serial cable PN 005845-001. To connect to a 25 pin sub D connector, use serial cable PN 002403-001.
2. Refer to the following serial interface specifications.

### Serial Interface Specifications: Serial Cable Settings

Connector	25-pin, Sub-D male,
Pin type	RS-232
Pin assignments:	
Pin 1	Chassis, Not Connected
Pin 2	TxD
Pin 3	RxD
Pin 4	RTS
Pin 5	CTS
Pin 7	Signal Ground

### Serial Interface Specifications: RS-232 Protocols

Transmission Rate	1200 baud
Bit Configuration	8 data bits, 1 stop
Bit parity	None
Control Codes	None
All lines end with Carriage Return Line Feed (CRLF)	
All transmission is ASCII string	

3. When correctly linked the EasyLyte will transmit to the external device all of the data that is printed by the EasyLyte printer, in the same format.

## QC Tests

1. To access the QC TEST? functions, answer the questions that appear on the EasyLyte display, as shown in the chart below.

LCD Screen Displays	Press
CALIBRATE NOW?	NO
DAILY CLEANER?	NO
STANDBY MODE?	NO
SECOND MENU?	YES
* SEE RESULTS? *	NO
* PACK USAGE? *	NO
* QUAL CONTROLS? *	NO
* OPER FUNCS? *	NO
* DIAGNOSTICS? *	NO
* DATE/RANGES? *	YES
* CHANGE DAY/TIME? *	NO
CAL FREQUENCY?	NO
Na/K/Cl or Na/K/Li RANGES?	YES
BLOOD Na LIMITS?	YES
"Numeric value" —> "Numeric value"	wait

2. Two numbers appear on the display screen separated by an arrow. A cursor will be positioned underneath the first digit of the first number.

▲ The second number is not applicable in this procedure.

3. Change the first number to "246.0" as follows. Press NO to change the first digit. When the digit is correct press YES to advance to the next digit.
4. Continue until the first number is changed to "246.0".
5. Press YES when finished. QC TEST? will appear on the screen. If an erroneous value is input the screen displays CORRECT?. Press NO to return to STEP 2 and correct the number.
6. Press YES to QC TEST?
7. Consult the table below which lists all of the QC tests and their functions. To select a test press YES. To bypass a test press NO.

**QC Test****QC Tests Function**

QC TEST?	Access to the QC Test functions.
TURN ON MV'S?	Prints the registered Na, K, Cl or Li electrode calibration and analysis results as millivolts. Calibration: Stds. A & B voltages Blood analysis: Sample and Std. A voltages Urine analysis: Sample and Std. B voltages To end printing, return to TURN ON MV's and press YES. At PLEASE CONFIRM!, press NO.
CHECK CAL CONSTS?	Displays the factory set electrode constants. The acceptable ranges are: Left column number: 0.92 to 1.08 Right column number: -800 to +800 If values are out of specification, contact Medica.
RAM/PROM TEST?	Displays current software version and date installed.
RAM CHECK OUT?	Clears the EasyLyte memory. This will erase all stored EasyLyte calibration and sample data. After testing this function exits the operator out of the QC TEST? menu and resets the analyzer. May also need to reset pack size.
SIPPER TEST?	Moves the sample probe all the way down, then up to test mechanical performance. Abnormal movement is indicated by the display messages: "MTS", "Na/K/CL" or "Na/K/Li."
PUMP TEST?	Rotates the pump 10 revolutions to test mechanical performance. Abnormal movement is indicated by the display message "MTP."
TEST CAROUSEL?	EasySampler QC Test Functions.
CALIB CAROUSEL?	Refer to the EasySampler section for details.
FIND HOME?	
CYCLE TRAY?	
SOL'N PURGE?	Purges any air in the fluid system. Calibration must be performed after a solution purge.
CALIBRATE NOW?	Performs analyzer calibration.
DIAGNOSTICS?	Performs diagnostic testing of the EasyLyte Analyzer (See Operator's Manual).
LAST CAL VALUES?	Checks last calibration values. Acceptable ranges are Na: 50-64, K: 50-64, Cl: 40-64, Li: 50-64.
ELECTR'D VALS?	Direct electrode millivolt readings. Typical values are Na: 40-100, K: 50-100 Cl: 60-100, Li: 30-60; Ca: 40-100, pH 50-200.
FLUID FLOW TEST?	Confirms that fluid is aspirating through the analyzer view window. SAMPLE DET. TEST? tests the sample detector, which detects the difference between air and liquid in the fluid system.
PUMP CAL TEST?	Checks the pump calibration. Expected values are between 500-800.

**continued****QC Test****QC Tests Function****TEST VALVE?**

Verifies probe/valve alignment and pump efficiency. Calculates the number of pump motor steps to move each solution from the valve through the probe to the sample detector. Typical values are Flush: 800-1200, Std B 800-1200, Std A 800-1200, Air 500-800. The three reagent values should be 100-200% of the Air value. In most cases, abnormal results indicate a faulty solutions valve, and leaks or obstructions in the flow path.



The operator must perform a successful SOL' N PURGE before this test.

**RUN STATISTICS?**

Analyzes standards A & B (in the EasyLyte Solutions Pack) as samples.

**RUN CONTROLS?**

Analyzes 8 normal or 8 abnormal control samples. Calculates the mean, standard deviation and coefficient of variation for control sets.



The operator must perform a successful CALIBRATION before running this test.

**TEST ALIGNMENT?**

Verifies the number of probe motor steps to move the probe through each solutions valve position. Hex values are Std. A: 3F, Flush: 3F, Std. B: 3F, Air: 3F. This test is useful only when assembling the EasyLyte analyzer.

**BURN IN?**

Manufacturer's procedure to test electronic components of the CPU assembly. Not applicable for servicing the analyzer.

**CONTINUOUS?**

Part of Burn In sequence.

**QC TEST?**

Access to the QC Test functions. Press NO to return to the main EasyLyte menu.

# Repair

---

## Repair Overview

Always consult the Troubleshooting section first to determine the problem before attempting to repair the analyzer.



Always remove the solutions pack and the electrode housing from the analyzer before beginning any repair work. Refer to the EasyLyte Operator's Manual for detailed instructions.

Follow the assembly and removal instructions in the order outlined in this section unless otherwise noted. Always unplug the power cord from the analyzer before beginning any repair work.

Note that only complete mechanical and electronic assemblies can be replaced. Refer to the Replacement List in the Product Description section which lists replaceable assemblies as well as consumable items. Consult the list to determine the appropriate replacement item and part number.

If repair to any electrical assembly is necessary, consult the Schematics in the Appendix for further detail. Service personnel are encouraged to contact Medica directly with any problems or concerns relating to electrical assemblies.

## Recommended Tools

The following is a list of the tools required to perform repairs on the EasyLyte analyzer. Please refer to this list to determine the appropriate tool and size needed.

- Needle nose pliers
- Phillips screwdriver, #1
- Phillips screwdriver, #2
- Allen wrench, 1/16 inch
- Scissors
- Hex nut driver, 11/32 inch, hollow stemmed
- Retaining ring pliers
- Resistor 10 OHM, 5 watts
- Volt meter

## Optional Tools

The following is a list of tools recommended to help perform repairs on the EasyLyte analyzer. Please refer to this list to determine the tool and part number when ordering.

Alignment Valve	000104-001
Mini-Test High Impedance Voltage Source	001374-001
Retaining ring pliers	002077-001

## Rear Housing Removal and Replacement

### Removal:

**Figure R1**

1. Disconnect the power cord from the entry module, see Figure R1.



Entry Module  
Power Cord



2. Detach the four screws from the rear housing using a #2 Phillips screw driver, as shown in Figure R2.

**Figure R2**

Four Screws



3. Separate the front and back housing.  
See Figure R3.

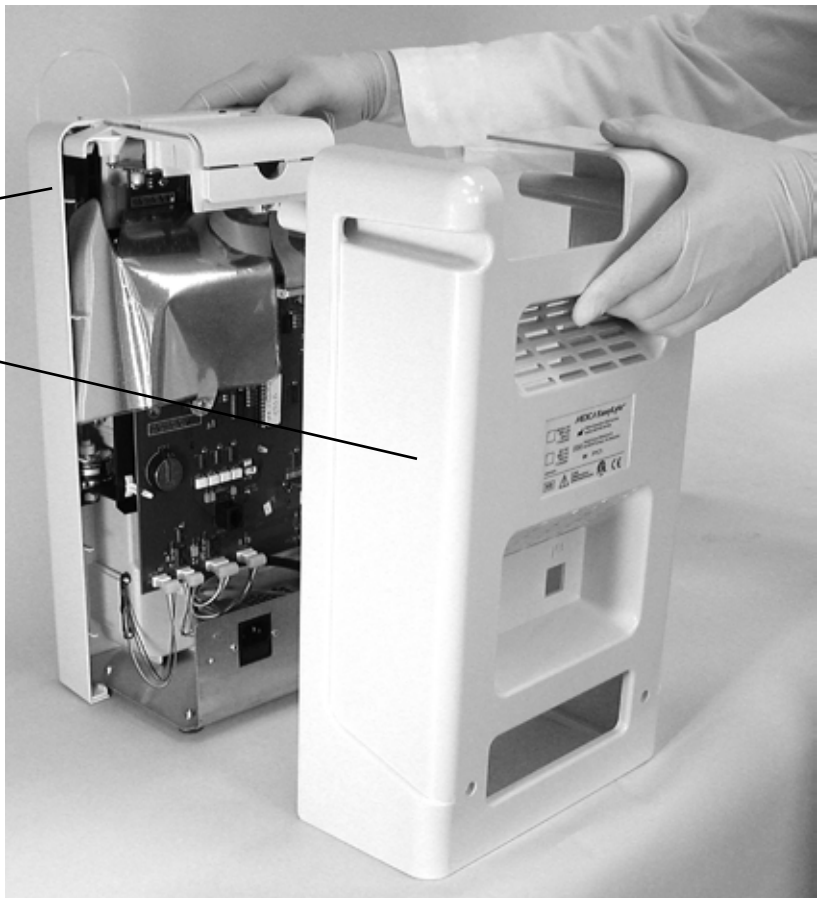
**Figure R3**

Front Housing

Rear Housing

**Replacement:**

1. Align and attach the front and back housing. Verify that all cable connectors are attached properly. Refer to Figures P1 and P6 in the Product Description Section for detail. Verify that all wires are contained within the front housing before proceeding.
2. Attach the four screws to the rear housing using a #2 Phillips screw driver, as shown in **Figure R2**.
3. Connect the power cord to the entry module.





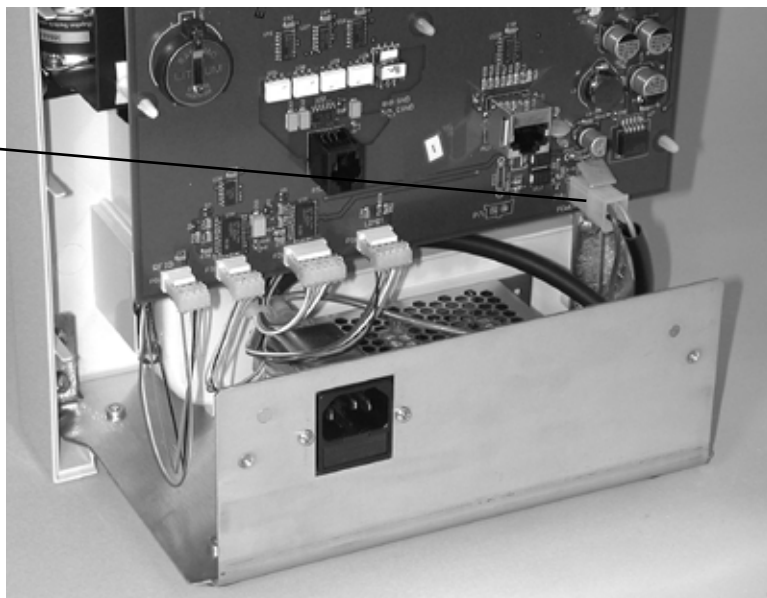
## Power Supply Removal and Replacement

### Removal:

**Figure R4**

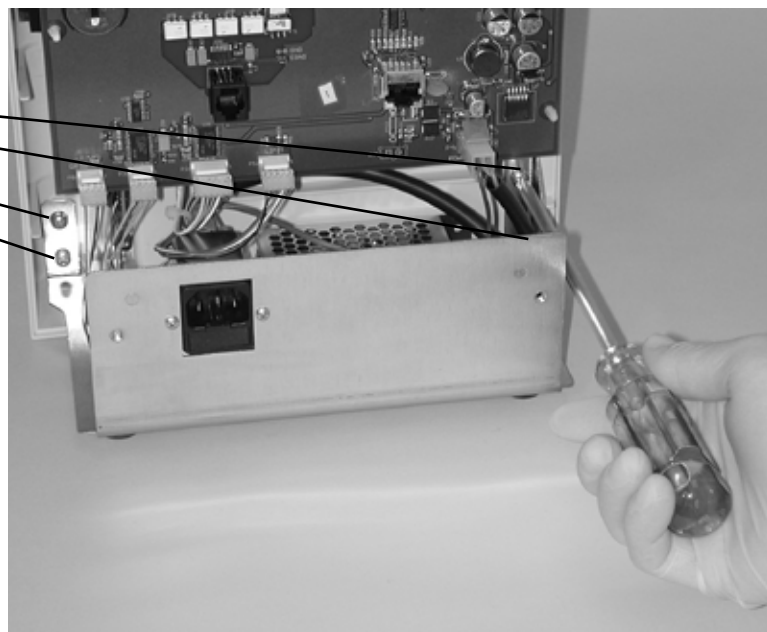
Power Supply Cable

1. Disconnect the power supply cable from the CPU board, see Figure R4.
2. Detach the four screws that attach the power supply bracket to the front housing, using a #2 Phillips screwdriver. See Figure R5



**Figure R5**

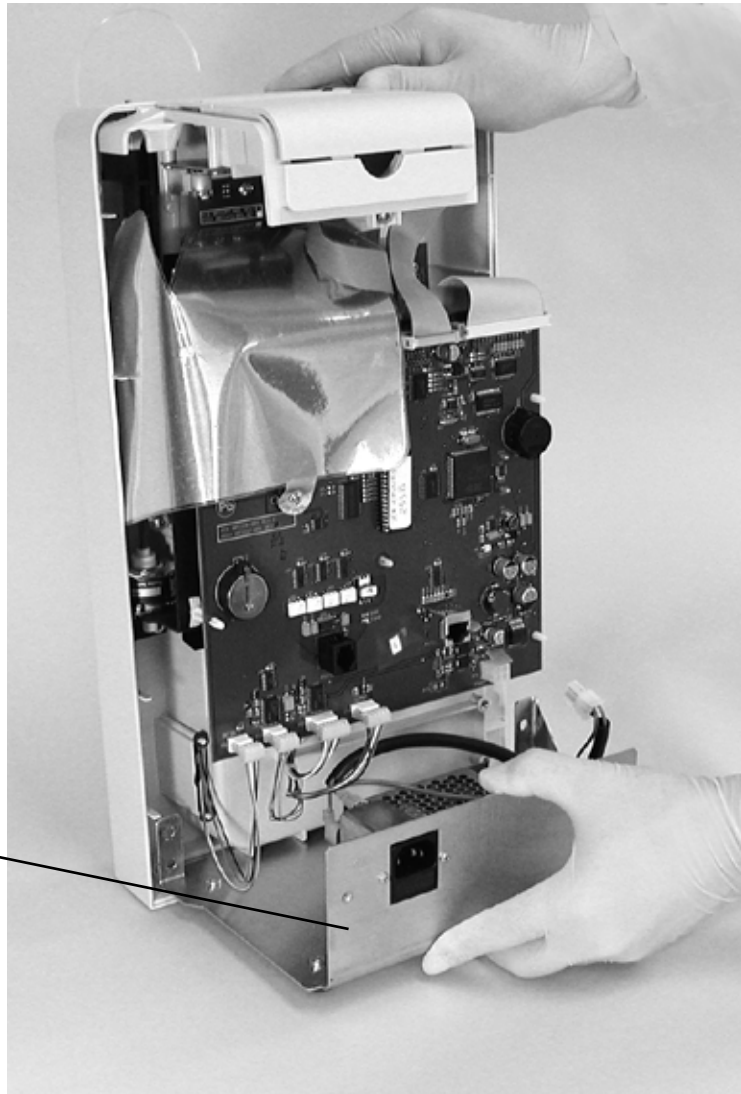
Four Screws



3. Slide the power supply assembly back away from the front housing assembly, as shown in Figure R6.

**Figure R6**

Power Supply Assembly



**Replacement:**

1. Slide the power supply assembly toward the front housing assembly, as shown in Figure R6.
2. Attach the four screws through the bottom of the front housing using a #2 Phillips screwdriver. See **Figure R5**.
3. Connect the power supply cable to the CPU board as shown in **Figure R4**.

## Printer Removal and Replacement

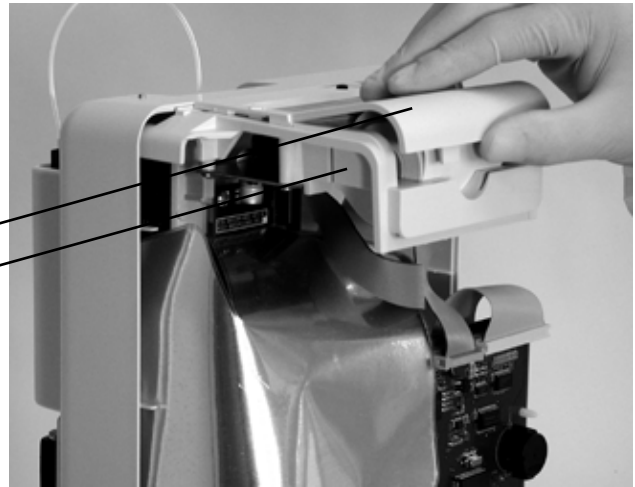
### Removal:

**Figure R7**

1. Remove the printer lid from the printer, see Figure R7.
2. Remove the paper roll from the printer bay, as shown in Figure R8.

Printer Lid

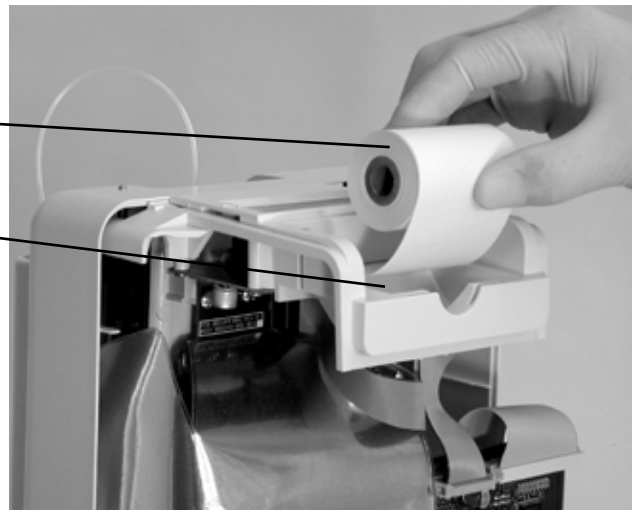
Printer



**Figure R8**

Paper Roll

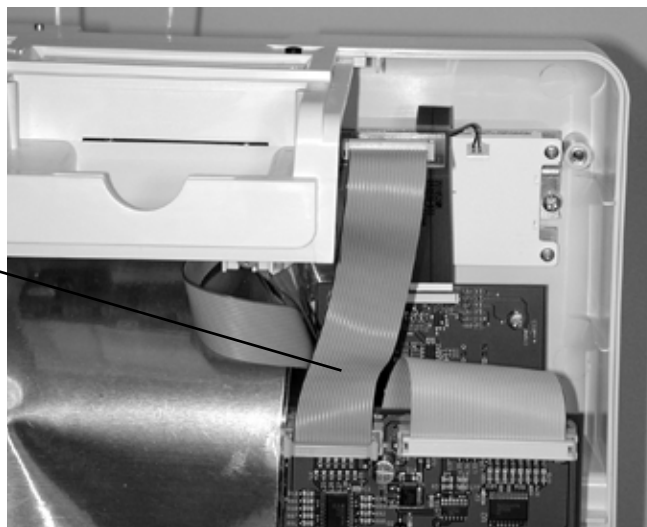
Printer Bay



3. Disconnect the printer cable from the CPU board, see Figure R9.

**Figure R9**

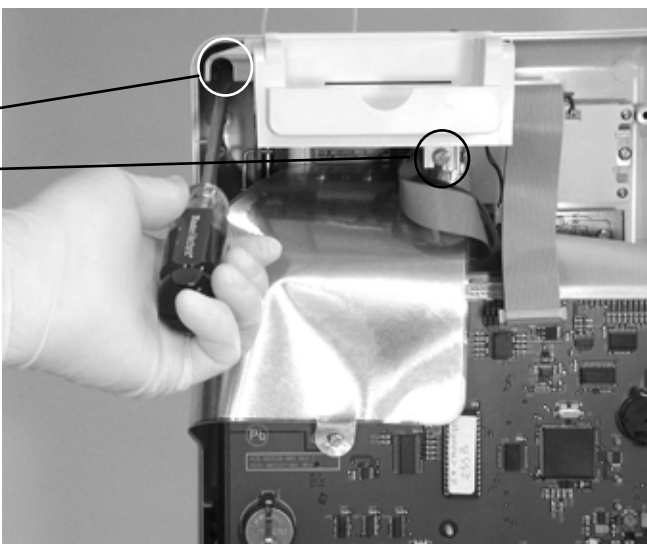
Printer Cable



4. Detach or loosen the two screws using a # 2 Phillips screw driver. See Figure R10.

**Figure R10**

Screws



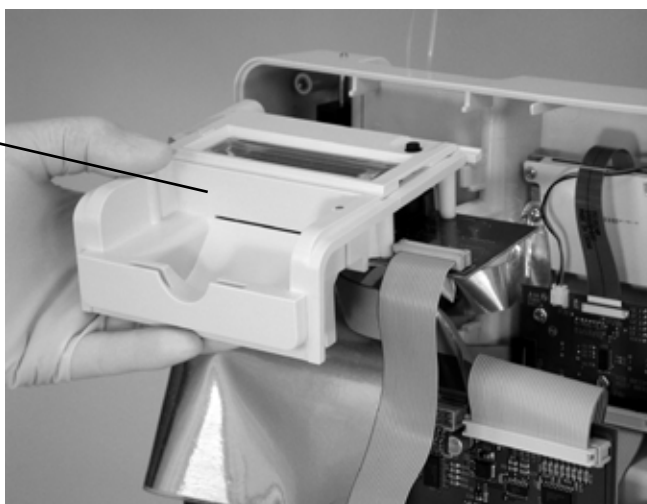
6. Remove the printer body as shown in Figure R11.

**Replacement:**

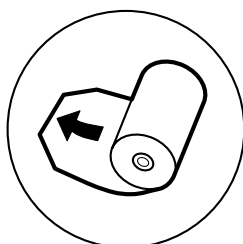
1. Install the printer body into place. See Figure R11.

**Figure R11**

Printer Body



2. Attach the two screws using a #2 Phillips screwdriver. See Figure R10.
3. Connect the printer cable to the CPU board, see Figure R9.
4. Using scissors, cut the corners off the beginning of the paper roll. See **Figure R8**.
5. Place the printer roll into the printer bay, as shown in **Figure R11b**.
6. Place the printer lid onto the printer. See **Figure R7**.

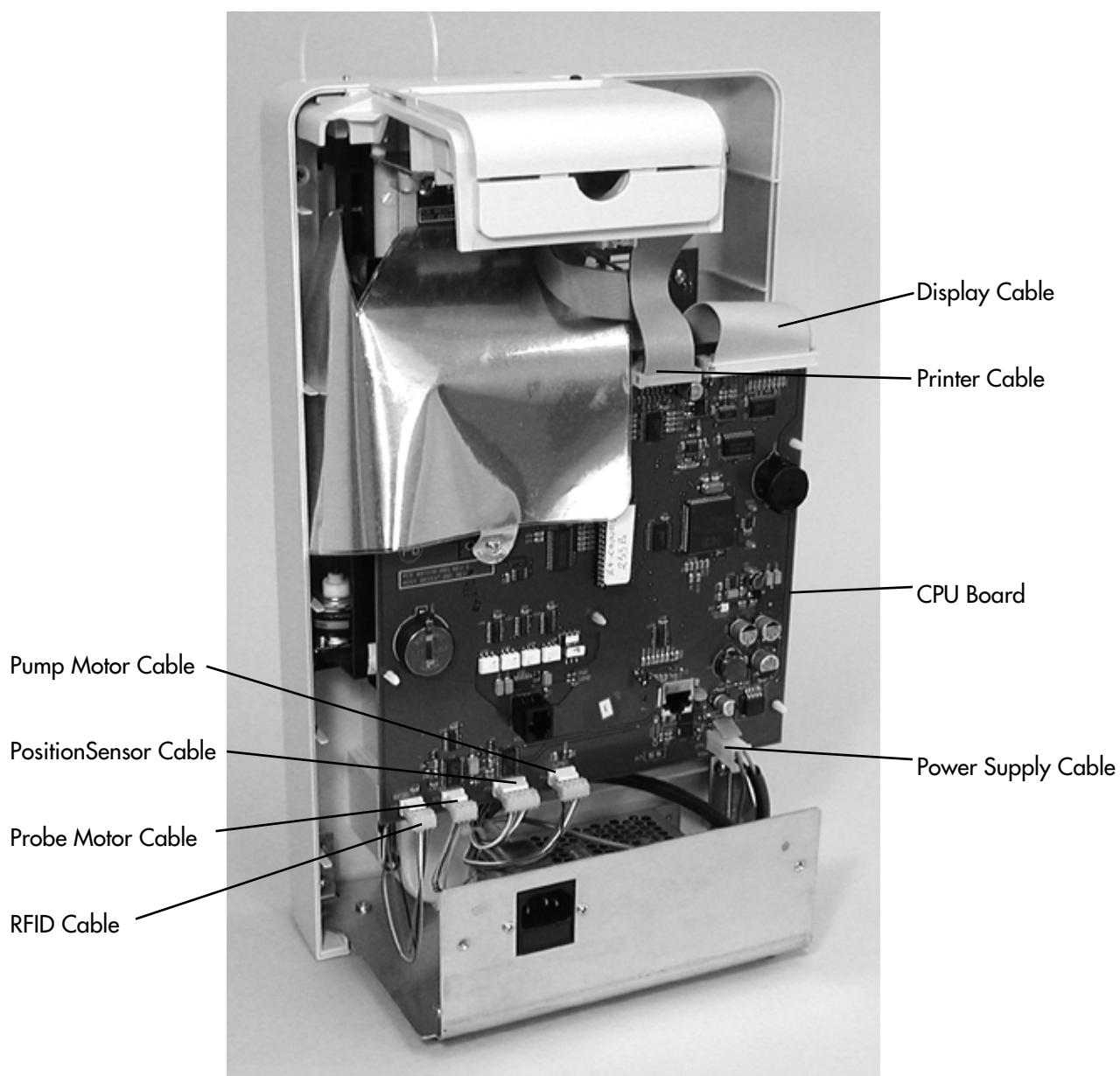
**Figure R11b**

## CPU Board Removal and Replacement

### Removal:

1. Disconnect the probe motor, sensor, pump motor, power supply, RFID display, and printer cables from the CPU board. See Figure R12.

**Figure R12**





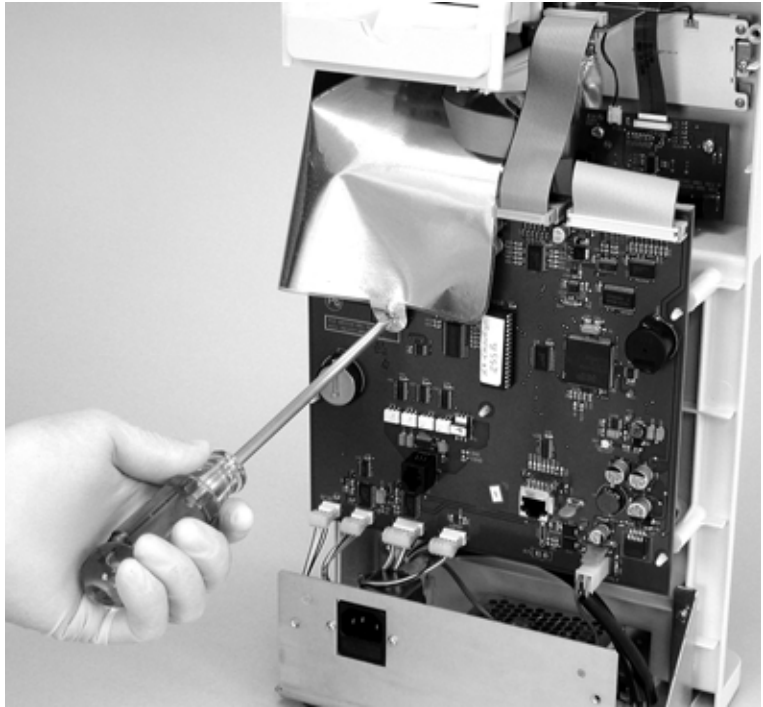
**Figure R13**

2. Disconnect EMI shield from CPU board using a #2 Phillips screwdriver. See Figure R13.

★ Make note of which electrode jacks connect to which pins on the CPU board prior to removing the electrode jacks from the pins. See Figure R17.

3. Disconnect the electrode jacks from behind the CPU board. See Figure R14 for the location of the electrode jacks. To disconnect, gently pull electrode jack straight away from the connector pin of the CPU Board.

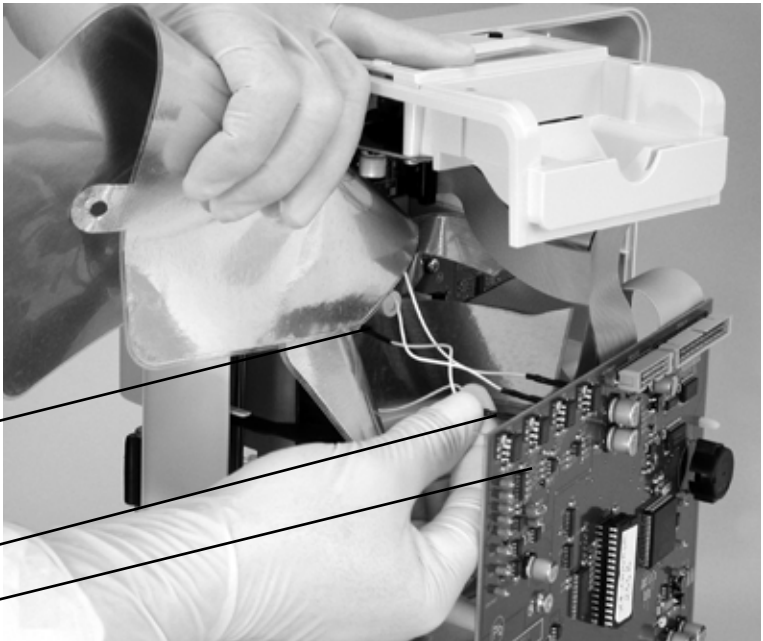
★ The connector pins are extremely delicate. To avoid pin breakage when removing the electrode jacks, gently pull the electrode jacks straight away from the pins. If a pin breaks the entire CPU board may require replacement.

**Figure R14**

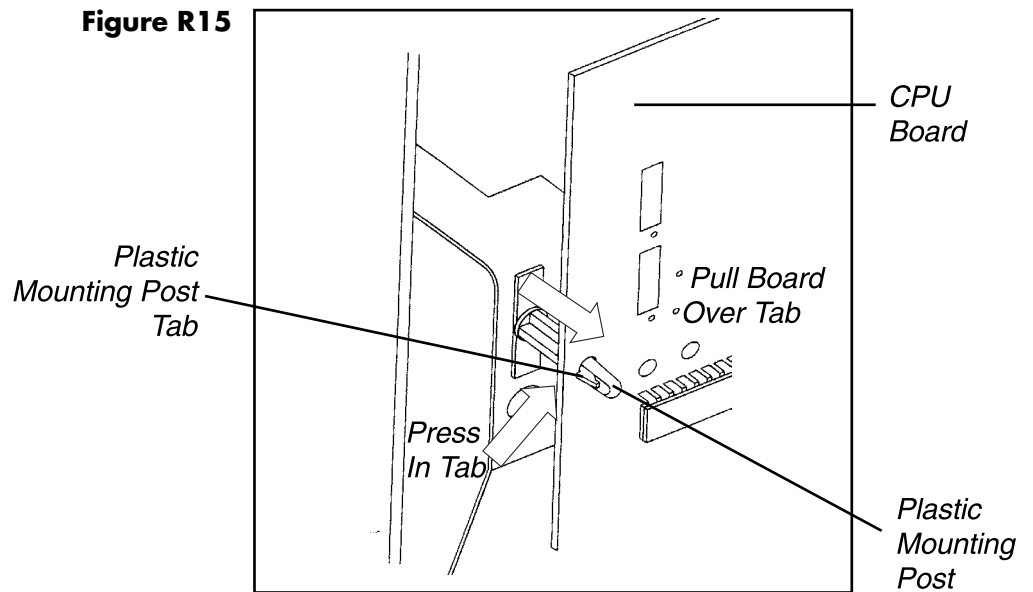
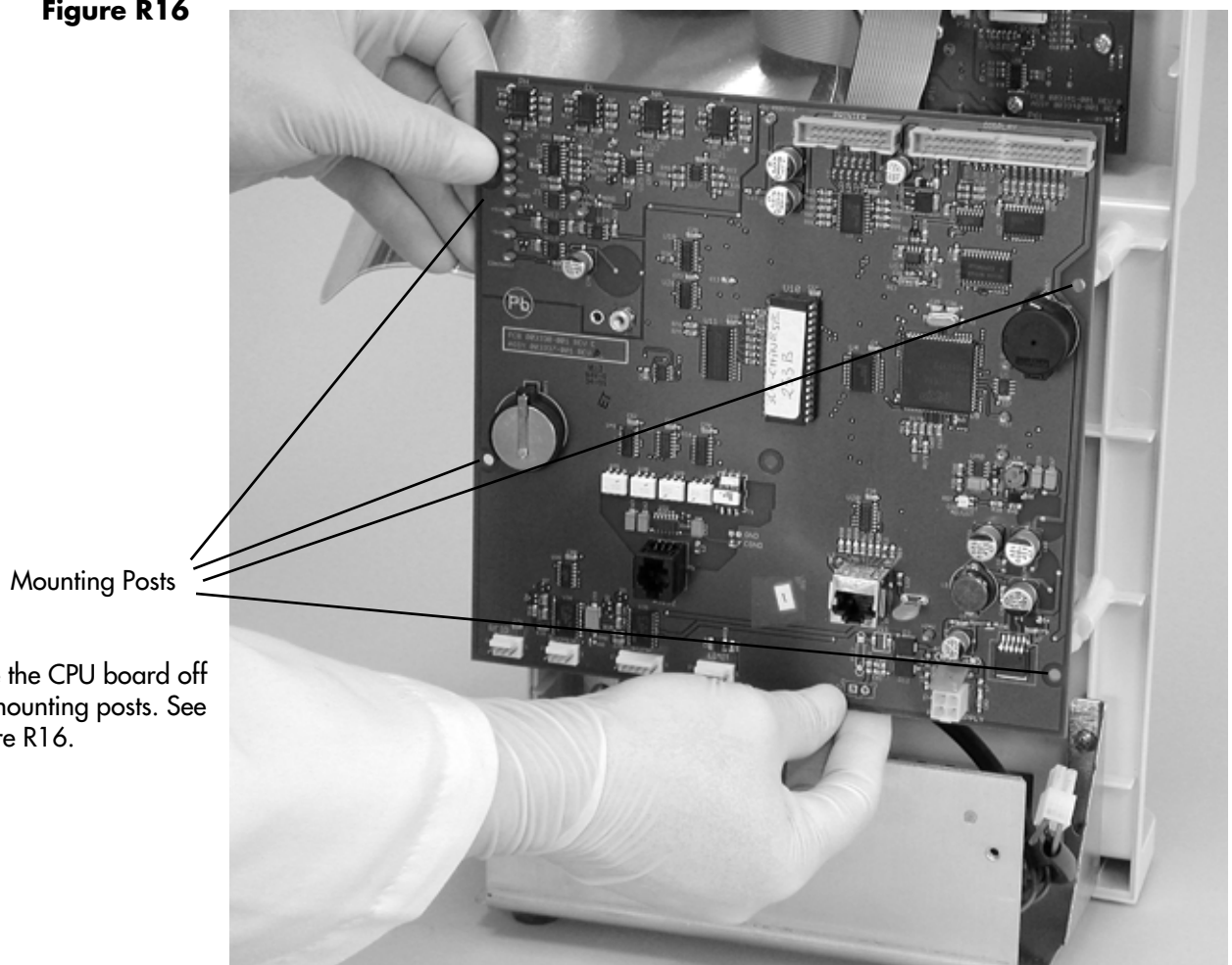
Electrode Jacks

Connector Pin to CPU Board

CPU Board



4. Disengage the CPU board from the four plastic mounting posts, located at each corner of the CPU board. To disengage, press the mounting post tab in and pull the CPU board over the tab, as shown in Figure R15.
5. Disengage the center plastic mounting post from the CPU board, located above the serial and EasySampler ports.

**Figure R15****Figure R16**

6. Slide the CPU board off the mounting posts. See Figure R16.

**Replacement:**

1. Align the CPU board with the plastic mounting posts. Snap the right side mounting posts of the CPU board into place. See **Figure R16**.

▲ Do not snap the left or center mounting posts into place at this time.

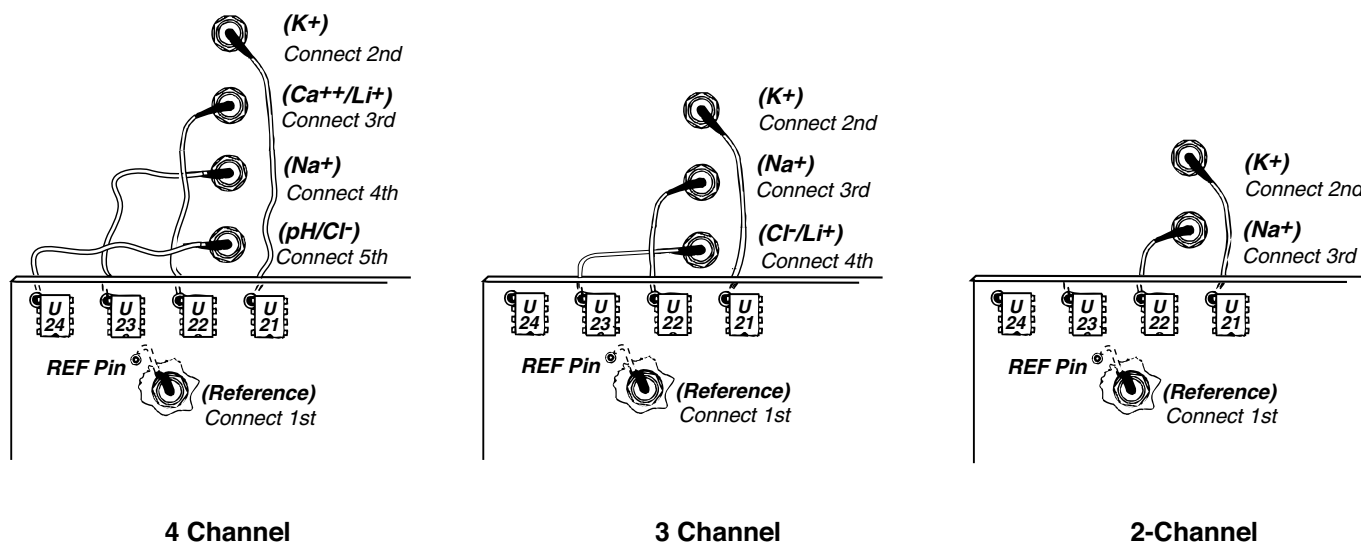
2. Carefully connect the electrode jacks to the back of the CPU board. To connect, gently push the electrode jack straight into the connector pin. See Figure R17 to determine the proper connector pin position on the CPU board and the recommended installation order.

★ Do not bend the connector pin when installing the electrode jack. If a pin breaks the entire CPU board may require replacement.

3. Snap the left and center mounting posts of the CPU board into place. See **Figure R16**.

4. Connect the probe motor, sensor, pump motor, power supply and printer cables to the CPU board, see **Figure R12**.

5. Reconnect the EMI shield to the CPU board using a #2 Phillips screwdriver. See **Figure R13**.

**Figure R17**



## Display Removal and Replacement

### Removal:

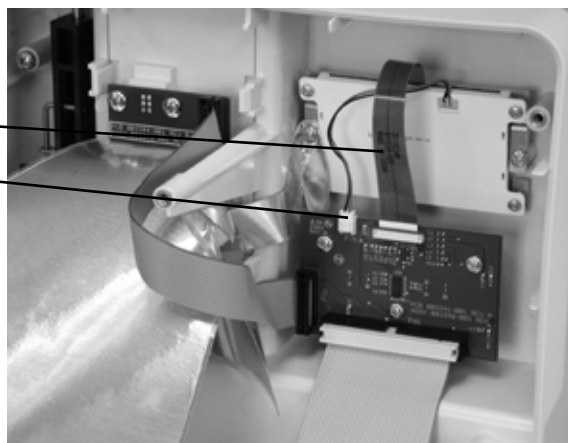
**Figure R18**

Display flex cable

Display power cable

★ Display flex cable is delicate. Use caution when handling.

1. Detach the Display flex cable and display power cable from Yes/No switch PCB. See Figure R18.
2. Detach the two short screws from the display assembly using a #2 Phillips screwdriver. See Figure R19.

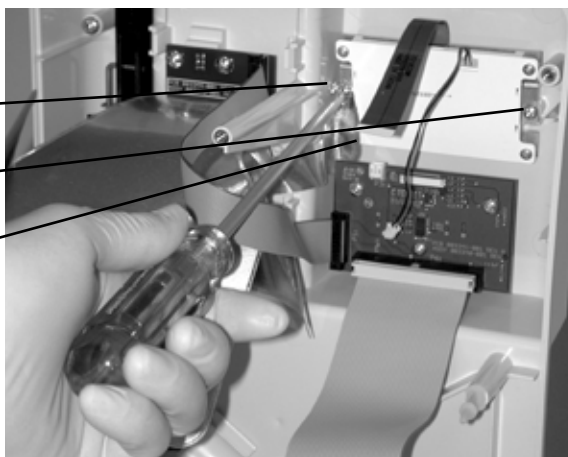


**Figure R19**

Screw 1

Screw 2

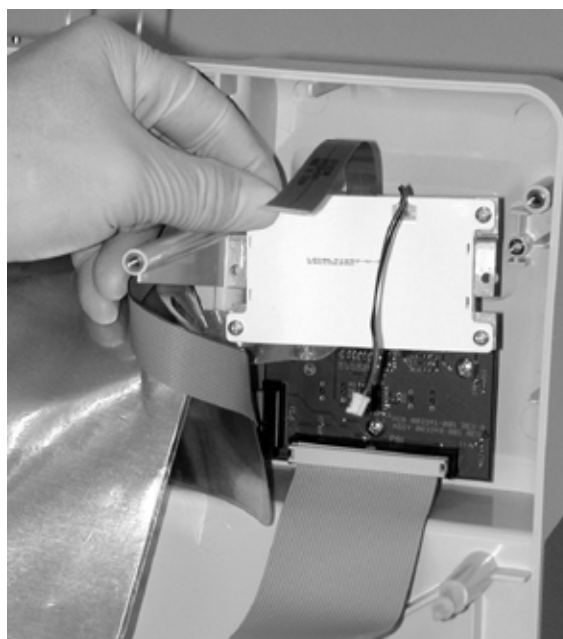
EMI shield connection



**Figure R20**

3. Carefully remove the display assembly from the front housing. See Figure 20.

▲ Make note of the orientation of the LCD screen. This is extremely important when installing the display assembly.



**Figure R21**

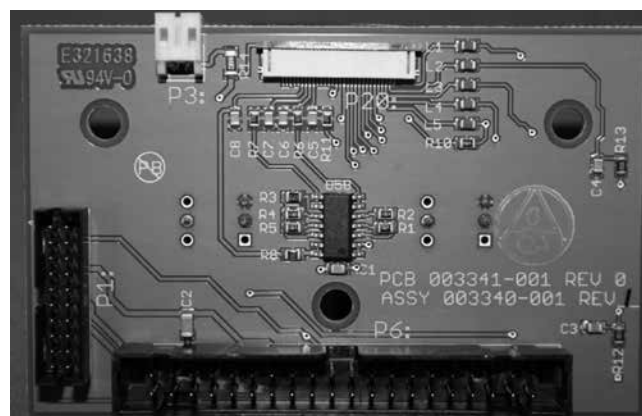
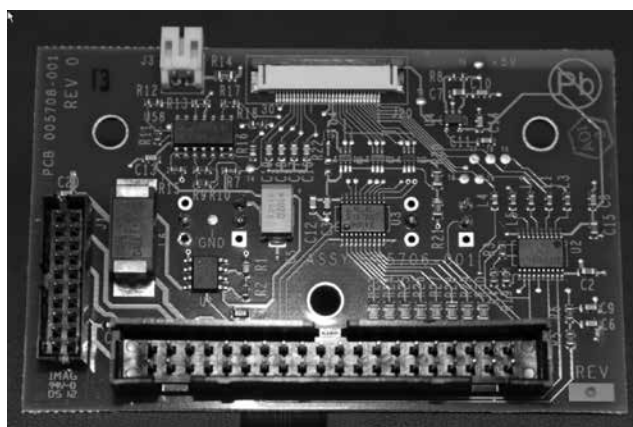
▲ Display and Yes/No PCB assemblies for analyzers with serial numbers below 43261 operate at 5 volts DC, while analyzers with serial numbers beginning with 43261 operate at 3 volts DC. The 3 and 5 volt assemblies are not compatible. Therefore, both 5 volt assemblies must be replaced if either fails.

**Figure R22**

The Medica part number for the Display Assembly (P/N 006760-001) will remain the same, however, the part number printed on the display has changed. The 5 volt display pictured in Figure R21 (labeled LEDBL51852-W-3) is obsolete and the new 3 volt display is pictured in Figure R22 (labeled LEDBL55472-W).

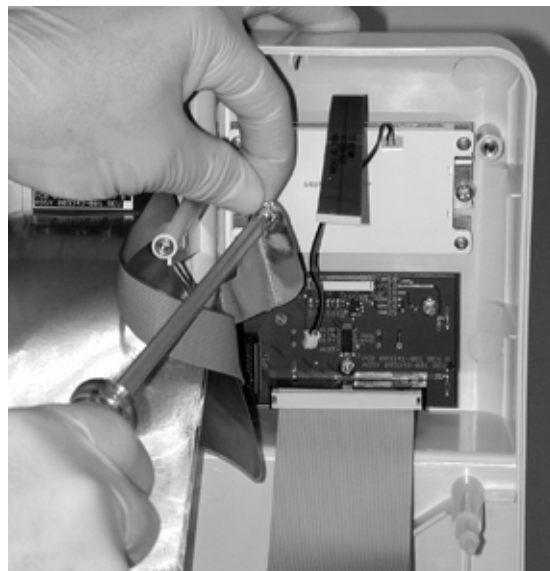
**Figure R23**

The Yes/No PCB Assembly (P/N 003340-001) is now obsolete and has been replaced with P/N 005706-001 as shown in Figures R23 and R24.

**Figure R24**

**Figure R25****Replacement:**

1. Position the front housing so that the front of the analyzer is facing down and place the display assembly into the front housing window with the cables at the top. See **Figure 20**.
2. Using a #2 Phillips screwdriver loosely attach right side screw to hold display assembly in place.
3. Reattach EMI shield to the display assembly using the left side screw and fully tighten both screws using a #2 Phillips screwdriver. See **Figure R25**.
4. Reconnect display flex cable and display cable to the Yes/No switch PCB. See **Figure R18**.



## Yes/No Switch PCB Removal and Replacement (refer to Figures and notes for R23 and R24 relating to using the correct version of the Yes/No PCB.

### Removal:

**Figure R26**

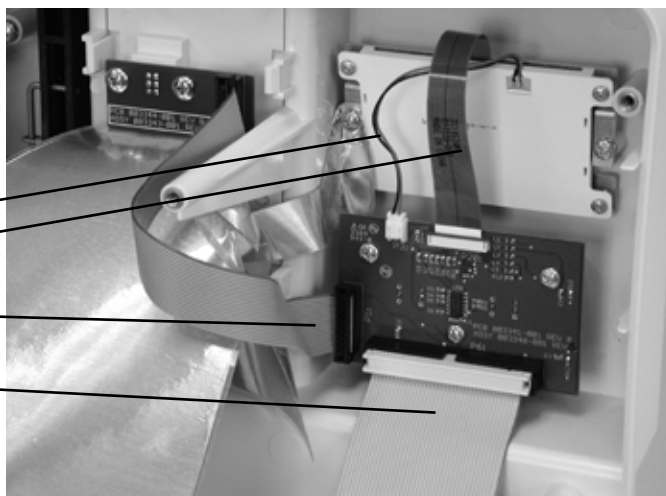
1. Detach all cables from Yes/No switch PCB.  
See Figure 26.

Display power cable

Display flex cable

Sample detector cable

Display cable



**Figure R27**

2. Remove three screws with nylon washers using a #2 Phillips screwdriver. See Figure R27.

Screws

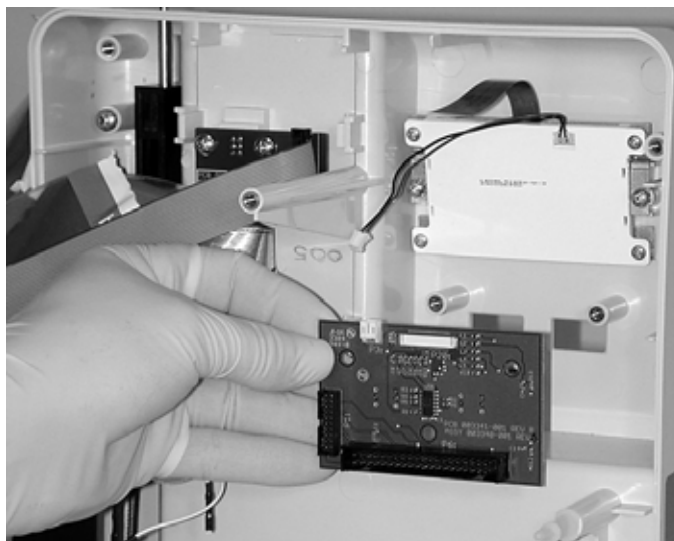


3. Carefully remove the Yes/No switch PCB from the front housing. See Figure R28.

**Figure R28**

### Replacement:

1. Position front housing so that the front of the analyzer is facing down. Place the Yes/No switch PCB into the front housing using the Yes/No Buttons as a guide. See Figure R28.
2. Using a #2 Phillips screwdriver attach Yes/No switch to PCB with three screws with nylon washers and fully tighten three screws. See Figure R27.
3. Reconnect display power cable, display flex cable, sample detector cable and display cable. See Figure 26.



## Sample Detector PCB Removal and Replacement

### Removal:

Figure R29

Sample Detector Cable

1. Disconnect sample detector cable from Yes/No switch PCB. See Figure R29.
2. Using a #2 Phillips screwdriver, detach the two screws holding the sample detector PCB. Remove sample detector PCB. See Figure R30.

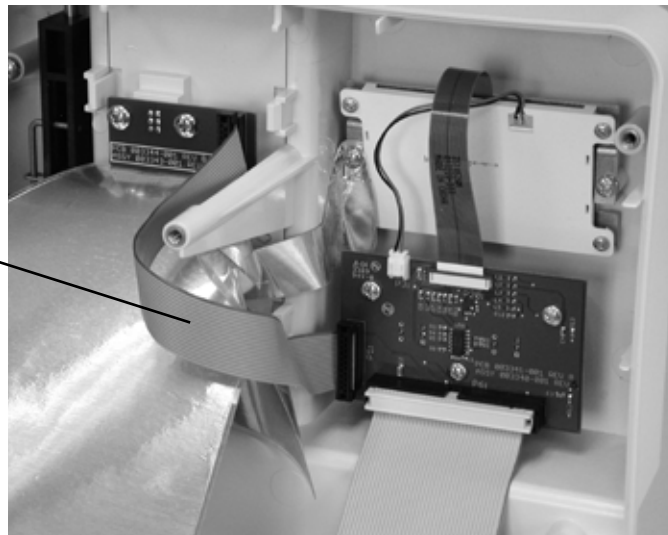


Figure R30

### Replacement:

1. Align the sample detector PCB so the sample detector cable is positioned on the right side. Attach the two screws tightly, using a #2 Phillips screwdriver, see Figure R30.
2. Install the sample detector in the front of the analyzer to verify the sample detector board alignment. See Figure R31. When properly aligned, fully tighten the sample detector screws.
3. Reconnect sample detector cable to Yes/No switch PCB. See Figure R29.



Figure R31



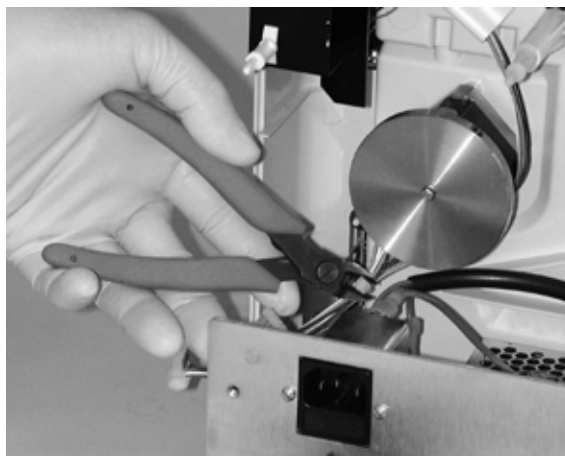


## Pump Motor Removal and Replacement

### Removal:

**Figure R32**

1. Remove the pump tubing from the front of the analyzer.
2. Using a wire cutter, cut the tie wrap that secures the pump motor cable wires, as shown in Figure R32.
3. Detach the two screws from the front of the analyzer, using a #1 Phillips screw driver. See Figure R33.
4. Remove the pump motor assembly, as shown in Figure R34.



**Figure R33**

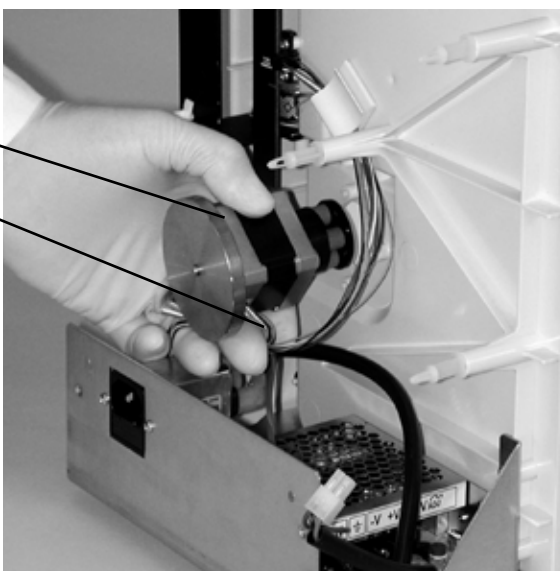
Screws



**Figure R34**

Pump Motor Assembly

Pump Motor Wires



### Replacement:

1. Install the pump motor assembly through the front housing and align two screw holes on the two plastic bosses, as shown in Figure R33. The pump motor wires are positioned below the pump when properly aligned.
2. Attach the four screws into the front of the analyzer, using a #2 Phillips screw driver. See Figure R33.
3. Using a tie wrap cable, secure the loose wires under the pump motor to the lead screw/probe motor wires and the sensor wires. Take care to position wires away from pump motor.
4. Install the pump tubing.

## Probe Motor Assembly Removal and Replacement

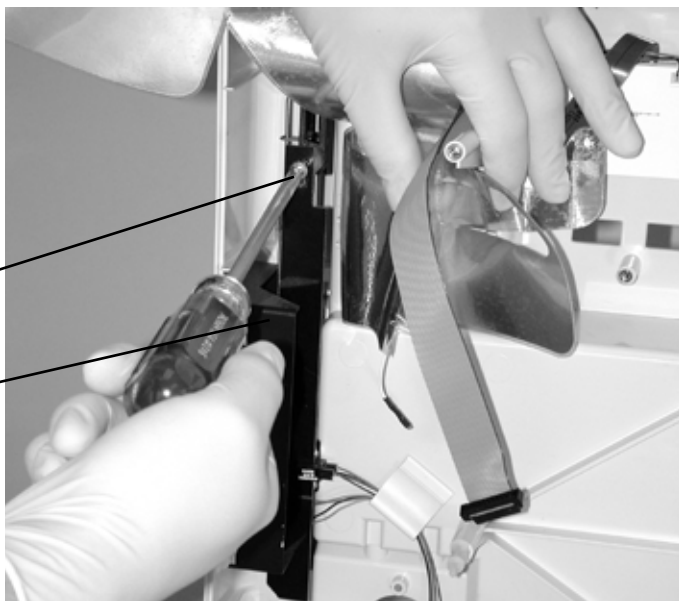
### Removal:

1. Detach the screw at the top of the probe position scale, using a #2 Phillips screw driver, as shown in Figure R35.
2. Remove the probe position scale, as shown in Figure R36.

**Figure R35**

Screw

Probe Position Scale



**Figure R36**

Probe Position Scale

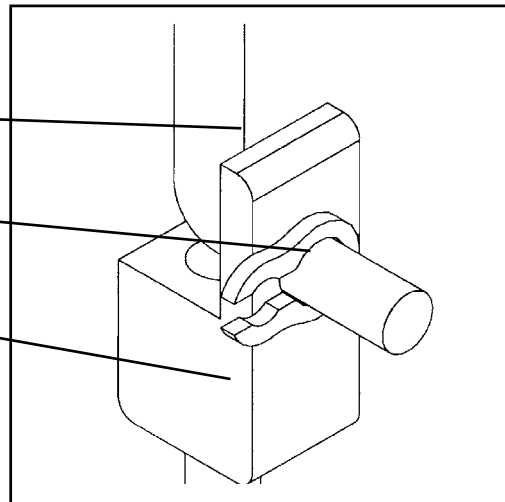


**Figure R37**

Actuator

Retaining Ring

Top of Lead Screw



3. Remove the C-shaped retaining ring from the actuator, using the retaining ring pliers, part number 002077-001. Do not stretch out the retaining ring with the pliers. Disengage the actuator from the top of the lead screw assembly. See Figure R37.

▲ Save the retaining ring.

4. Remove the probe motor cable wires from the retaining clamp. See Figure R38.

**Figure R38**

Retaining Clamp

Probe Motor Wire Cables





5. Detach the three screws from the probe motor bracket, using a #2 Phillips screwdriver, as shown in Figure R39. Remove the washers. The other two screws are located on the bottom edge of the bracket.
6. Remove the Probe Motor Assembly, as shown in Figure R40.

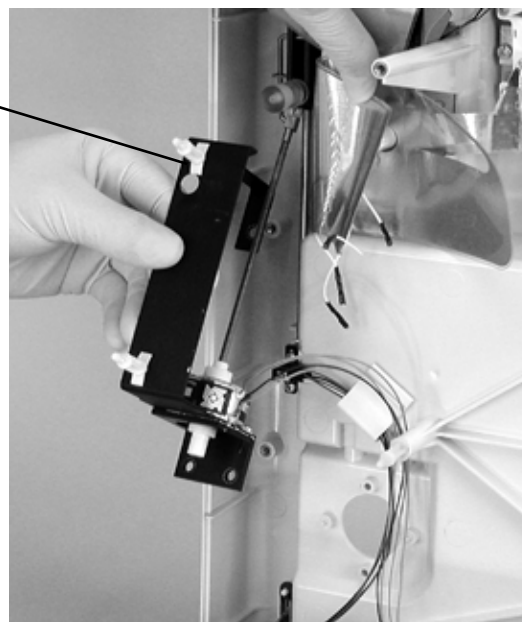
**Figure R39**

Probe Motor Bracket

Screws

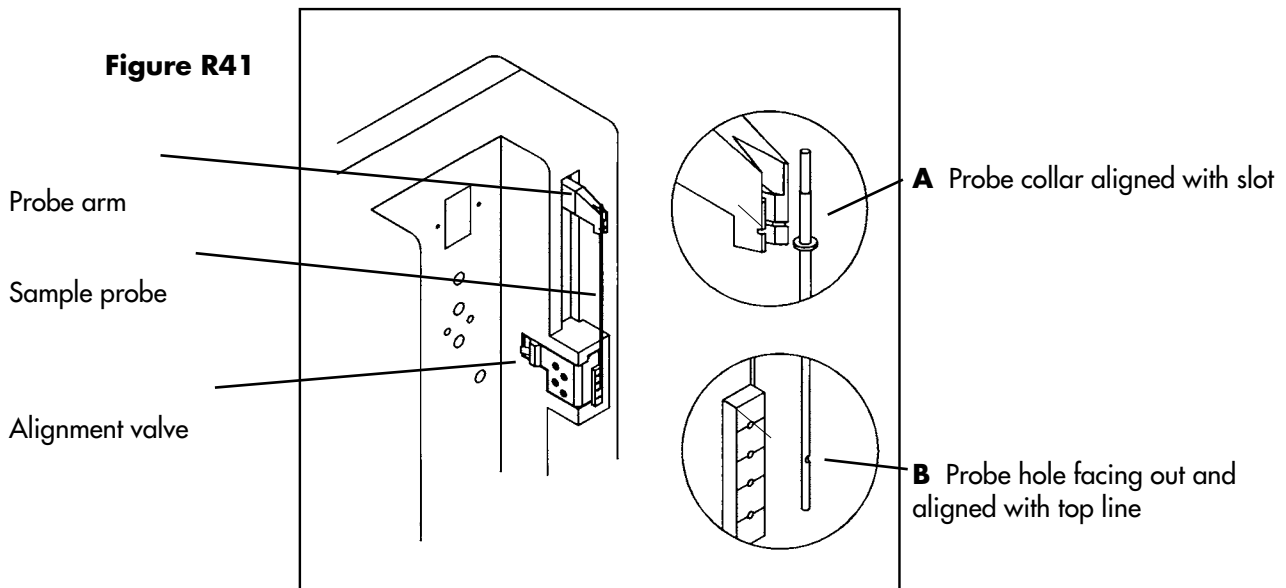
**Figure R40**

Probe Motor/Lead Screw Assembly

**Replacement:**

1. Place the probe motor assembly into place. See Figure R40.
2. Attach the three screws to the probe motor assembly bracket, using a #2 Phillips screw driver. See Figure R39. The other two screws are located on the bottom edge of the bracket.
3. Insert the actuator through the top of the lead screw assembly as shown in **Figure R37**. Install the retaining ring onto the actuator using the retaining ring pliers. Do not stretch out the retaining ring with the pliers.
4. Place the probe motor cable wires into the retaining clamp. See **Figure R38**.

5. Install the alignment valve tool, part number 000104-001, in place of the solutions valve.
  6. Install the sample probe as follows. Refer to Figure R41 for details.
    - A. With the probe hole facing out, align the probe collar with the white line on the top of the probe arm. When aligned, snap the probe into the probe arm.
    - B. Manually move the probe arm until the sample probe hole is aligned with the top line marked on the alignment valve. See Figure R41.
- ▲ When the sample probe is aligned, do not move the probe arm until the probe motor installation is complete.

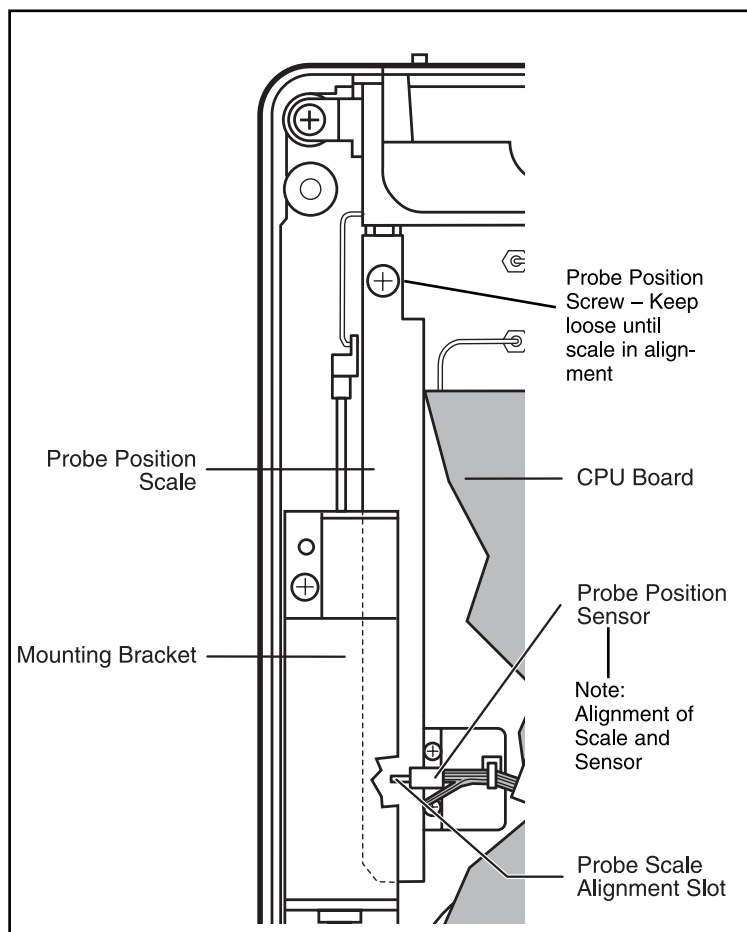


7. Hold the sample probe against the alignment valve tool to keep in place. Install the probe position scale through the top of the housing, see Figure R36. Verify the probe position alignment slot is located on the bottom right side of the scale.
8. Place the scale into position. The scale should be seated inside the probe position sensor and inside the mounting bracket slot. See Figure R42.
9. Attach and slightly tighten the washer and screw at the top of the position scale. Do not fully tighten the screw.
10. Align the probe position scale slot within the center of the probe position sensor.  
Gently move the scale to the left and visually confirm the alignment. Refer to Figure R42 for correct alignment.

▲ Confirm that the sample probe hole is aligned with the top line marked on the alignment valve, on the front of the analyzer, before continuing.

**Figure R42**

11. When alignment is complete, fully tighten the probe position screw into place using a #2 Phillips screw driver, as shown in Figure R35. Confirm alignment is still good.



## Guide Rod Removal and Replacement

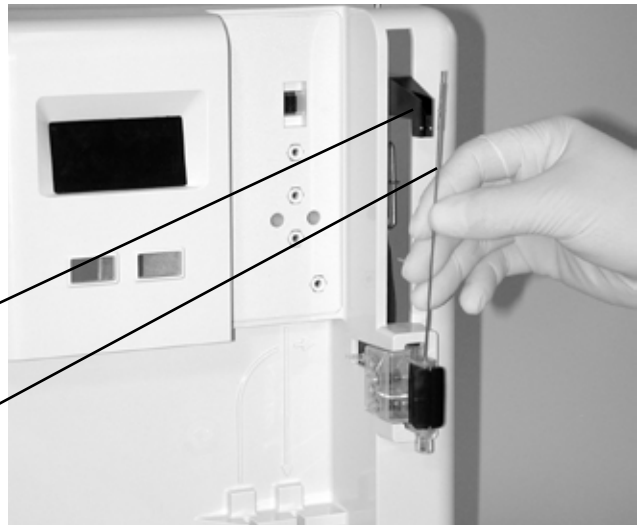
### Removal:

1. Remove the sample probe from the probe arm and the solutions valve. See Figure R43. Remove the solutions valve.
2. Detach the screw from the bottom of the guide rod, using a #2 Phillips screw driver, as shown in Figure R44. Remove the washer.

**Figure R43**

Probe Arm

Sample Probe



**Figure R44**

Guide Rod

Screw



3. Remove the guide rod and probe arm assembly, down and away from the housing. See Figure R45.

**Replacement:**

1. Install the guide rod as shown in Figure R45. To install, first insert the guide rod into the alignment hole located in the top wall of the front assembly.
2. Attach the washer and screw to the bottom of the guide rod, using a #2 Phillips screw driver. See Figure R44.

**Figure R45**

Alignment Hole  
Guide Rod  
Probe Arm



## Electrode Jack Removal and Replacement

### Removal:

**Figure R46**

Nut Driver

Electrode Jack Wires



1. Insert the electrode jack wires into the 11/32 inch nut driver. See Figure R46.
2. Remove the hex nuts and washers using the nut driver. See Figure R47.
3. Pull the electrode jacks from the front housing of the analyzer, as shown in Figure R48.

**Figure R47**



**Figure R48**

Analyzer Front Housing

Electrode Jack



### Replacement:

1. Push the electrode jacks through the holes in the front of the analyzer and thread washer and hex nut onto electrode jack wire. See Figure R48.
2. Insert the electrode jack wires into the 11/32 inch nut driver. See Figure R46.
3. Attach the hex nut using the nut driver, and tighten, as shown in Figure R47.

## RFID PCB Removal and Replacement

**Figure R49**

### Removal:

1. Using needle nose pliers, carefully squeeze the two retaining clips and remove from posts. See Figure R49.
2. Slide RFID PCB out from slot in front housing. See Figure R50.

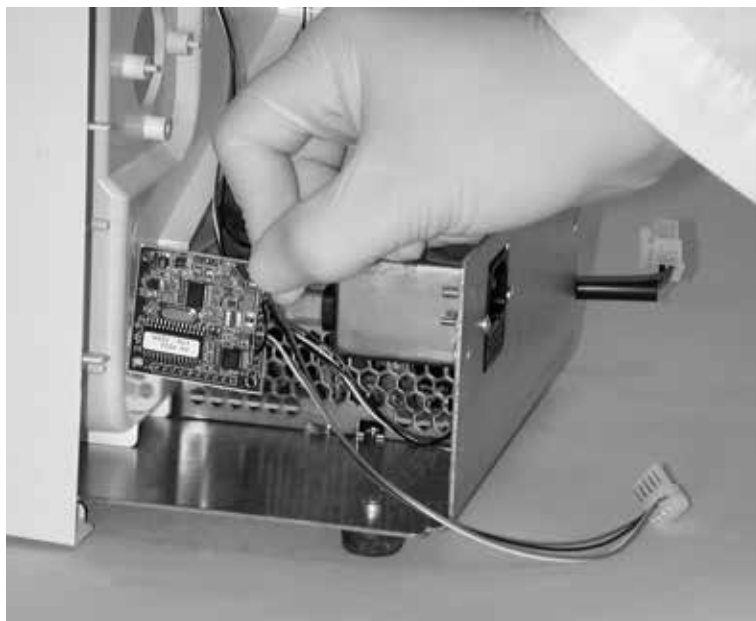
▲ Do not damage posts.



**Figure R50**

### Replacement:

1. Slide RFID PCB into slot located in the front housing. See Figure R50.
2. Install two new retaining clips with the flat edge of the retaining clips facing the left and right sides of the front housing. Push retaining clips on with needle nose pliers. See Figure R49.



# EasySampler Product Description

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The EasySampler, when used with the EasyLyte analyzer, provides automated batch sampling of serum, plasma or diluted urine for electrolyte analysis. The EasySampler can also perform emergency (STAT) analysis of blood samples on demand.

The EasySampler contains a 25 position sample tray which includes a STAT, daily cleaner and two quality control positions. The tray holds either 500 µl or 2 ml sample cups.

The EasyLyte analyzer software allows the operator to perform EasySampler diagnostics by simply pressing the "YES" or "NO" buttons in response to prompts displayed on the analyzer LCD screen. Results are always displayed on the LCD screen and can also be documented on paper by the EasyLyte analyzer printer.

## Assembly and Component Overview

The EasySampler is made up of the following mechanical assemblies and associated components. Refer to Figure A1 to determine the location of each assembly or component in relation to the EasySampler.

**EasySampler Housing** case of the EasySampler.

**IR Windows** covers the IR beam transmitter and receiver.

**Chassis Assembly** frame which supports the mechanical assemblies.

**PC Board Assembly** contains the PC board and IR transmitter and receiver.

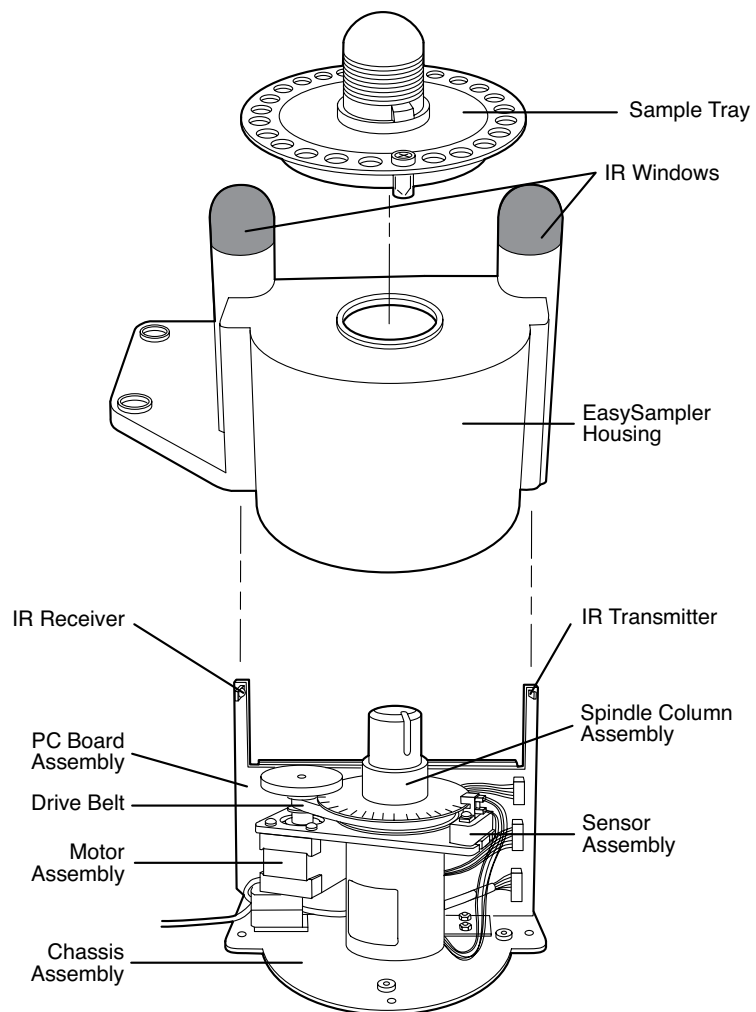
**Motor Assembly** powers the spindle column assembly.

**Drive Belt** connects the motor assembly to the spindle column assembly.

**Spindle Column Assembly** rotates the sample tray.

**Sensor Assembly** detects the sample tray position.

**Sample Tray** holds the samples for analysis.



**Figure A1 - EasySampler Assemblies and Components**



## Replacement List

The following assemblies and components can be purchased directly from Medica.

Description	Part No.
EasySampler Housing	002530-001
IR Windows	001192-001
Chassis Assembly	001370-002
PC Board Assembly	001233-001
Motor Assembly	001328-001
Spindle Shelf Assembly	001196-001
Column Assembly	001368-001
Sensor Assembly	001306-001
Drive Belt	001197-001
Motor Driver IC or PCB	002973-002

## EasySampler Troubleshooting Guide

Refer to the chart below to determine the problem and corrective action needed.

Problem Description	Problem Source	Corrective Action Steps
LCD screen displays "OBSTRUCTION" and analyzer is beeping	SAFETY BEAM OBSTRUCTION	<ul style="list-style-type: none"> <li>• Verify there is no IR obstruction</li> <li>• Sensor Verification</li> </ul>
LCD screen displays "MTS" "TURN TRAY HOME" or "MTC"	INCORRECT PROBE or TRAY MOVEMENT	<ul style="list-style-type: none"> <li>• Alignment Verification</li> <li>• Tray Placement Verification</li> <li>• Carousel Test</li> <li>• Tray Cycle Verification</li> <li>• Sensor Verification</li> </ul>

## Alignment Verification

1. Remove and reinstall the power cord. The sample tray will rotate and then stop.
2. ALIGN PROBE/CUP? appears on the LCD screen. Press YES to verify the probe alignment. The sample probe will descend and stop above the "Daily Cleaner" cup position.
3. ALIGN CUP!/CUP ALIGNED? appears on the LCD screen; do not press YES or NO at this time.
4. Verify that the tip of the sample probe is centered over the "Daily Cleaner" cup position. Based on the inspection results, take the appropriate corrective action.
  - Probe Aligned: If sample probe is aligned in the proper position, press YES to the ALIGN CUP!/CUP ALIGNED? display. ALIGNMENT OK? appears on the LCD screen; press YES. CALIBRATE NOW? appears on the LCD screen; press YES. Return to normal operation.
  - Probe Misaligned: If the probe is misaligned, proceed to step 5.
5. Grasp the EasySampler and analyzer at the base and carefully slide forward until the EasySampler extends over the edge of the work surface.
6. Turn the knob underneath the EasySampler base slightly clockwise to loosen. Do not remove the knob.
7. Locate the hub on top of the EasySampler tray. Move the hub and the knob together, until the sample probe aligns with the "Daily Cleaner" cup position.
8. When aligned, hold the hub in place and turn the knob counterclockwise to tighten.
9. Grasp the EasySampler and analyzer at the base and carefully slide back to the original work area.
10. Press YES to the ALIGN CUP!/CUP ALIGNED? display. ALIGNMENT OK? appears on the LCD screen; press YES. CALIBRATE NOW? appears on the LCD screen; press YES.

## Tray Placement Verification

1. Advance to the DAILY CLEANER? display; press YES. TRAY IN PLACE? appears on the LCD screen; press YES.
2. The sample tray should rotate and stop with the probe at cup position "12".
3. CLEANER IN TRAY? appears on the LCD screen; press NO.
4. The sample tray should rotate and then stop with the probe at "Daily Cleaner" position.
5. Based on the test results, take the appropriate corrective action.
  - Correct Position: If the tray stops at the correct position, return to normal operation.
  - Incorrect Position: If the tray stops at an incorrect position, perform the Carousel Test.

## Carousel Test

1. Enter the QC TEST? menu and proceed to TEST CAROUSEL?. Refer to QC Test in this section for further instructions.
2. At the TEST CAROUSEL? display, press YES.
3. CALIB CAROUSEL? appears on the LCD screen; press YES. The sample tray should spin one revolution; then stop.
4. FIND HOME? appears on the LCD screen; press YES. The sample tray should spin and stop with the probe at the "Daily Cleaner" position.
5. Based on the CALIB CAROUSEL? test results, take the appropriate corrective action.
  - Error Message: If "MTC" or "CAROUSEL PROBLEM" appears on the LCD screen perform Sensor Verification.
  - No Error Message: If no error message appears on the LCD screen, perform Tray Cycle Verification.

## Tray Cycle Verification

1. Enter the QC TEST? menu and proceed to the TEST CAROUSEL? test. Refer to QC Test in this section for further instructions.
2. At the TEST CAROUSEL? display, press YES. At the CALIB CAROUSEL? display, press NO. At the FIND HOME? display, press YES. The tray should spin and stop with the sample probe at the "Daily Cleaner" position.
3. CYCLE TRAY? appears on the LCD screen; press YES.
4. The sample tray should rotate from the "Daily Cleaner" position to each cup position and back for cup positions "NORMAL through 10". Then the sample tray should reverse direction and rotate from the "Daily Cleaner" position to each cup position and back for cup positions "11 through STAT".
5. The sample tray will perform four complete rotation cycles as described above.
6. The analyzer will print the test results during the fourth cycle, as illustrated in the example below.

Cup Position	Number of Steps to Cup Position	Number of Steps to Daily Cleaner
1	0097	0100
2	0196	0196
3	0292	0292
4	0388	0388

7. Verify that the number of steps between adjacent cup positions is 0096 +/- 0006 for both columns of test data.
8. Based on the tray cycle test results, take the appropriate corrective action.
  - Error Message: If "MTC" or "CAROUSEL PROBLEM" appears on the LCD screen during testing, perform Sensor Verification.
  - In Specification: If tray cycle readings are in specification, exit the QC TEST? menu and return to normal operation.

## Sensor Verification

1. Remove the rear housing of the EasyLyte analyzer as detailed in Rear Housing Assembly Removal in the Repair Section.
2. Connect a voltage meter to the EasyLyte analyzer. Attach one reference lead to TP11 (DGND) and the other to U13 PIN #2 on the analyzer CPU board.
3. Manually turn the sample tray so the probe is at the "Daily Cleaner" position.
4. Verify that the measured voltage is greater than 4.50 volts.
5. Manually turn the sample tray off the "Daily Cleaner" position.
6. Verify that the measured voltage is less than 0.50 volts.
7. Based on the voltage test results, take the appropriate corrective action.
  - In Specification: If voltage readings are in specification, adjust the drive belt tension and repeat Tray Cycle Verification. If "MTC" or "CAROUSEL PROBLEM" errors continue, replace the spindle column assembly. Refer to Spindle Column Removal and Installation in this section for details.
  - Out of Specification: If voltage readings are out of specification, replace the sensor assembly. Refer to Sensor Removal and Installation in this section for details.

## QC Tests

1. To access the QC TEST? functions, answer the questions that appear on the EasyLyte display, as shown on the chart below.

LCD Screen Displays	Press
CALIBRATE NOW?	NO
DAILY CLEANER?	NO
STANDBY MODE?	NO
SECOND MENU?	YES
* SEE RESULTS? *	NO
* PACK USAGE? *	NO
* QUAL CONTROLS? *	NO
* OPER FUNCS? *	NO
* DIAGNOSTICS? *	NO
* DATE/RANGES? *	YES
* CHANGE DAY/TIME? *	NO
CAL FREQUENCY?	NO
Na/K/Cl or Na/K/Li RANGES?	YES
BLOOD Na LIMITS?	YES
"Numeric value" → "Numeric value"	wait

2. Two numbers appear on the screen separated by an arrow. A cursor will be positioned underneath the first digit of the first number.

▲ The second number is not applicable in this procedure.

3. Change the first number to "246.0" as follows. Press NO to change the first digit. When the digit is correct press YES to advance to the next digit.
4. Continue until the first number is changed to 246.0.
5. Press YES when finished. QC TEST? will appear on the screen. If a value other than "246" is input the screen displays CORRECT?. Press NO to return to STEP 2 and correct any error.
6. Press YES to QC TEST?

7. Consult the table below which lists all the QC tests and their functions. To select a test press YES. To bypass a test press NO.

<b>QC Test</b>	<b>QC Test Function</b>
QC TEST? .....	Access to the QC Test Functions.
TURN ON MVs?	
START CLOCK?	Analyzer QC Test Functions.
CHECK CAL CONSTS?	Refer to the main Troubleshooting Section
RAM/PROM TEST?	for information on QC testing
SIPPER TEST?	the EasyLyte analyzer.
PUMP TEST?	
TEST CAROUSEL? .....	Verifies EasySampler movement functions.
CALIB CAROUSEL? .....	Moves sample tray one revolution.
FIND HOME? .....	Returns sample tray to "Daily Cleaner" position.
CYCLE TRAY? .....	Performs four complete tray cycles to each cup position.
SOL'N PURGE?	
CALIBRATE NOW?	
DIAGNOSTICS?	
LAST CAL VALUES?	
ELECTR'D VALS?	Analyzer QC Test Functions.
FLUID FLOW TEST?	Refer to the main Troubleshooting Section
SAMPLE DET. TEST?	for information on QC testing
PUMP CAL TEST?	the EasyLyte analyzer
TEST VALVE?	
RUN STATISTICS?	
RUN CONTROLS?	
TEST ALIGNMENT?	
BURN IN?	
CONTINUOUS?	
QC TEST? .....	Access to the QC Test Functions. Press NO to return to the main EasyLyte menu.

## EasySampler Repair Overview

Always consult Troubleshooting in this section first to determine the problem before attempting to service the EasySampler.

Please note that complete mechanical assemblies can be replaced. Refer to the Replacement List in this section which lists replaceable assemblies and appropriate catalog numbers.

### Recommended Tools

The following is a list of the tools required to perform repairs on the EasySampler. Please refer to this list to determine the appropriate tool and size needed.

Phillips screwdriver, #1

Phillips screwdriver, #2

Flat head screwdriver, 7/32 inch

Allen wrench, 1/16 inch

Open end wrench, 1/4 inch

Volt meter

## EasySampler Housing Removal and Replacement

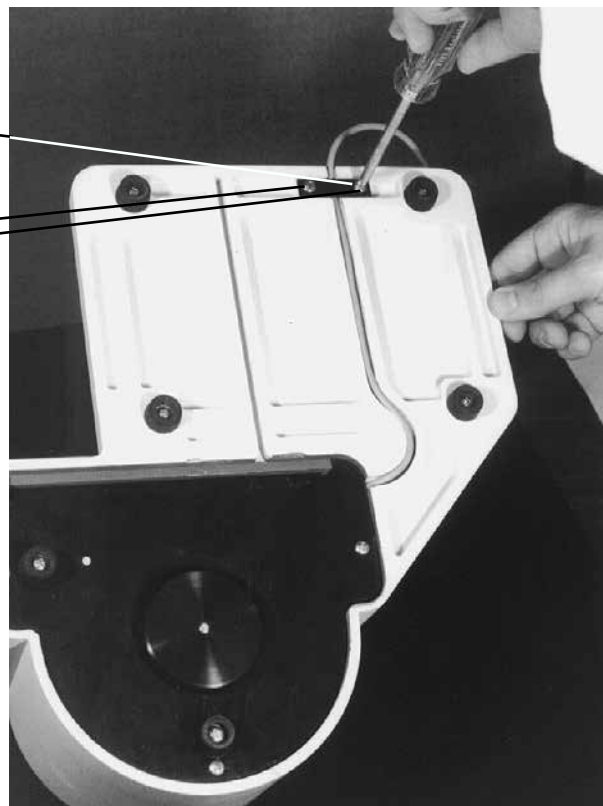
Removal:

1. Turn the EasySampler upside down and gently place on a flat surface.
2. Remove the two screws from the cable retaining plate using a #2 Phillips screwdriver, as shown in Figure A2.

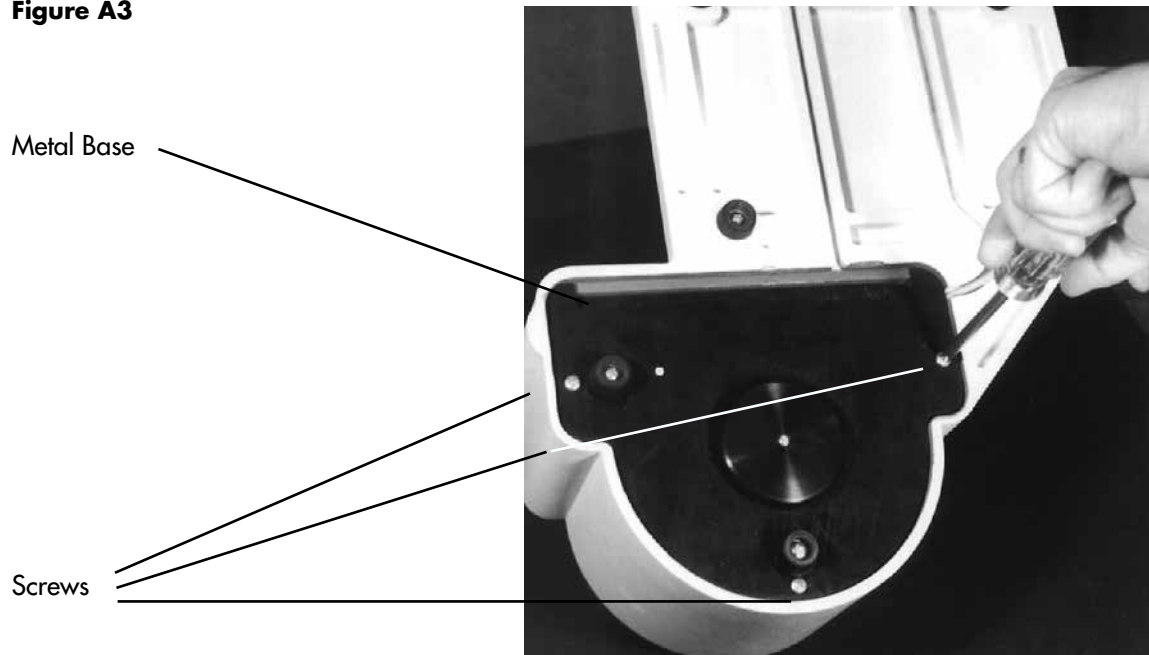
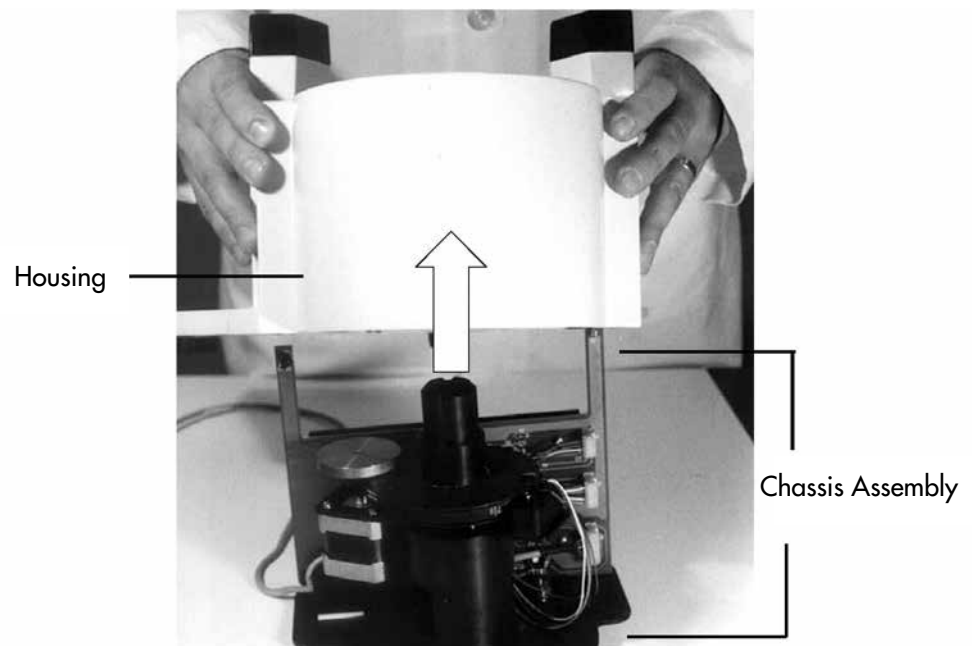
**Figure A2**

Cable Retaining Plate

Screws



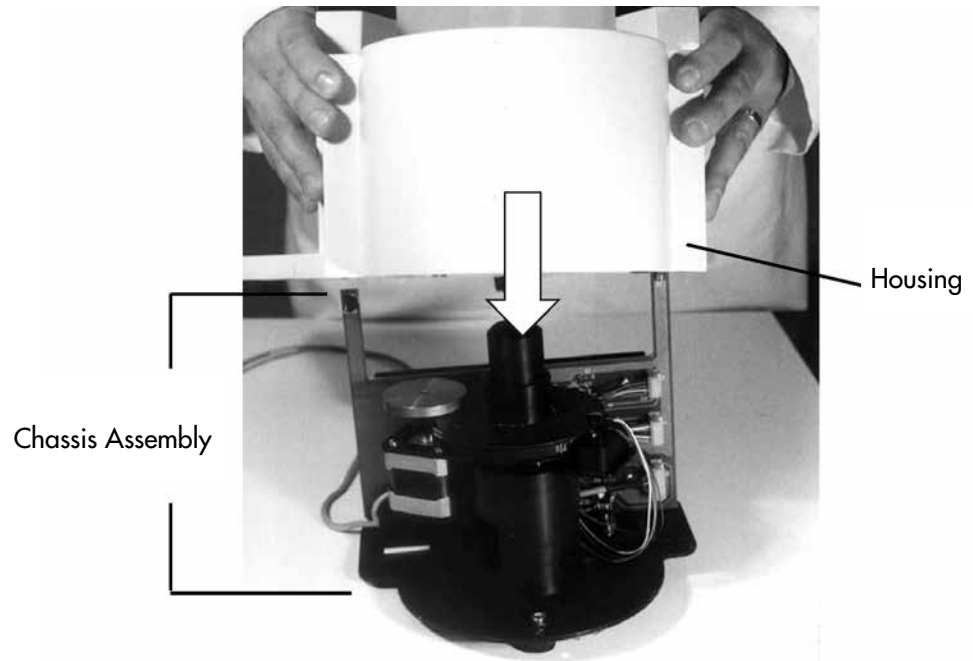
3. Remove the EasySampler cable from the groove in the bottom of the housing.
4. Remove the three screws from the metal base using a #2 Phillips screwdriver, as shown in Figure A3.
5. Turn the EasySampler to the upright position.
6. Lift the housing, as shown in Figure A4, to remove from the chassis assembly.

**Figure A3****Figure A4**



**Replacement:**

1. Align and place the housing over the chassis assembly, as shown in Figure A5.  
Be careful not to damage the IR receiver or transmitter on the PCB.

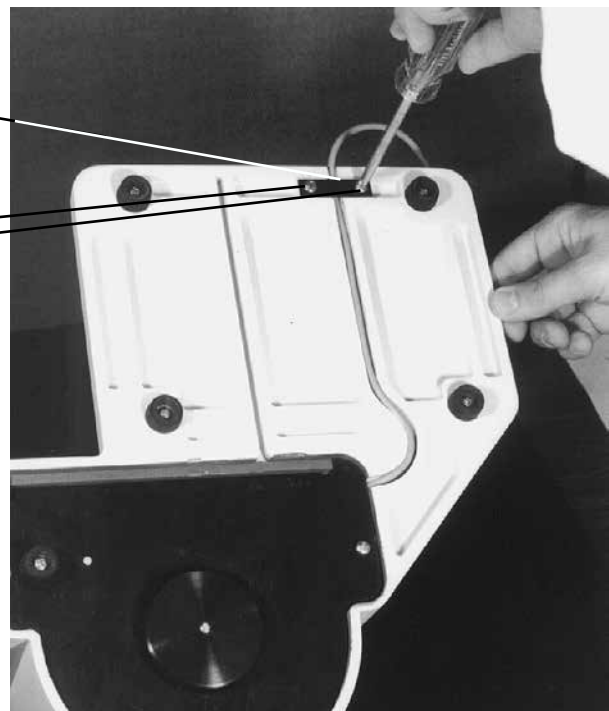
**Figure A5**

2. Turn the EasySampler upside down and gently place on a flat surface.
3. Attach the three screws to the metal base using a #2 Phillips screwdriver (see Figure A3).
4. Thread the EasySampler cable into the groove in the bottom of the housing. See Figure A6.
5. Attach the two screws to the cable retaining plate using a #2 Phillips screwdriver, as shown in Figure A6.

**Figure A6**

Cable Retaining Plate

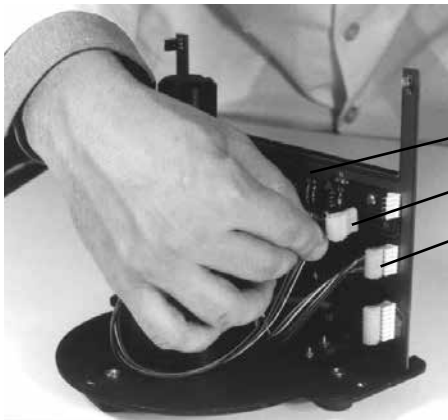
Screws



## Spindle Column Removal and Replacement

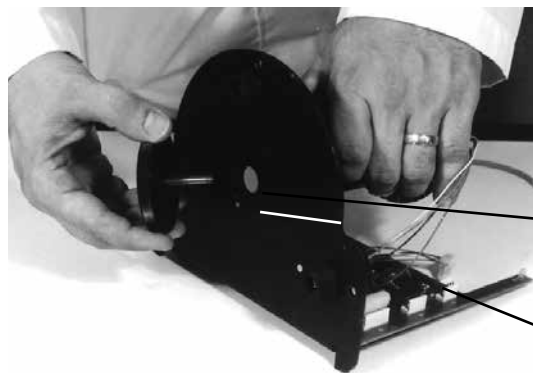
### Removal:

1. Disconnect the sensor cable and the motor cables from the PC Board. See Figure A7.
2. Turn the adjustment knob counterclockwise to loosen. Remove the adjustment knob from the bottom of the chassis assembly, as shown in Figure A9. Some EasySamplers use a spacing disk that should be removed and retained.



**Figure A7**

PC Board  
Sensor Cable  
Motor Cable

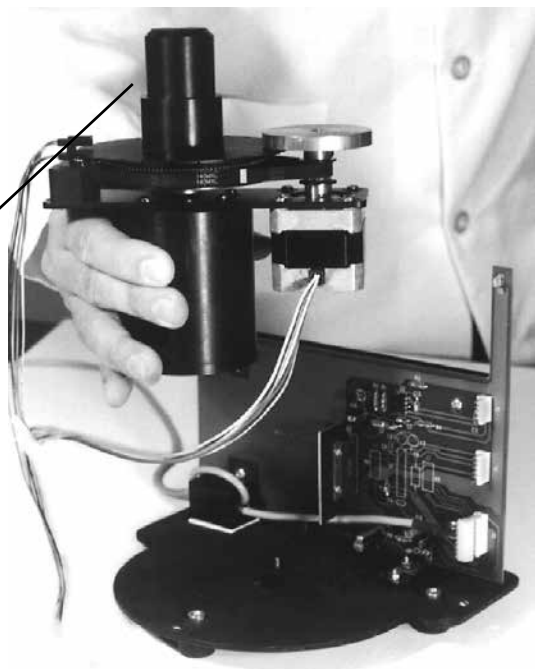


**Figure A8**

Adjustment  
Knob  
Chassis  
Assembly

3. Remove the spindle column assembly, as shown in Figure A9.

**Figure A9**  
Spindle Column  
Assembly

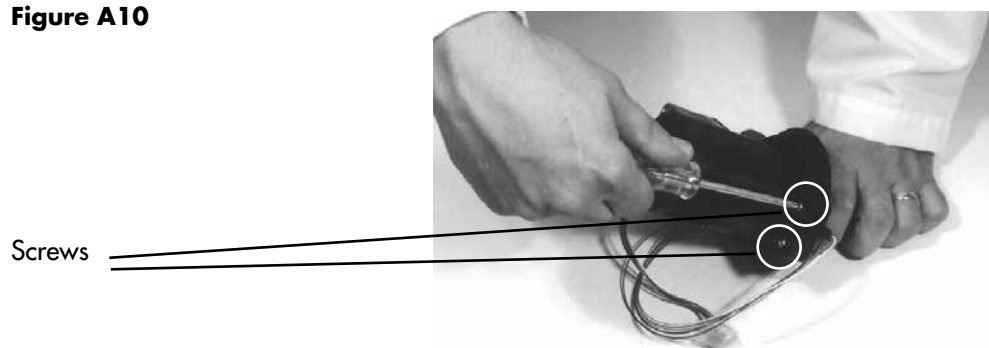
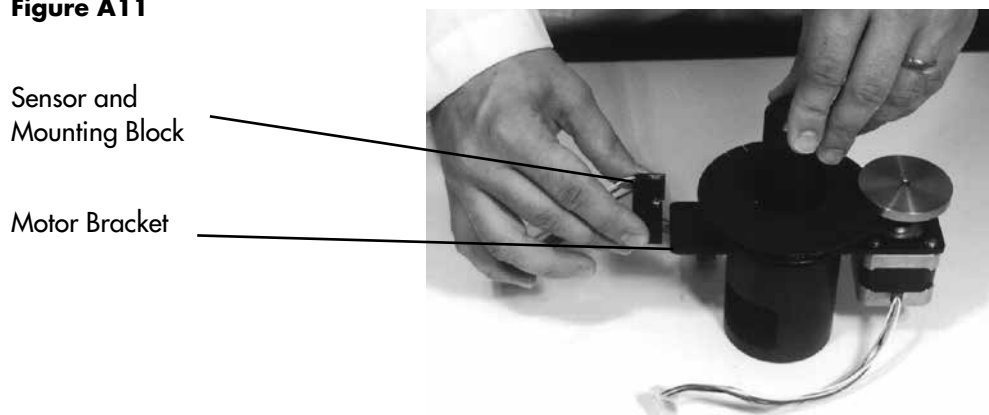


**Replacement:**

1. Place the spindle column assembly down into place, as shown in Figure A9.
  2. Attach the adjustment knob (see Figure A8) and turn clockwise to tighten.
- ▲ Some EasySamplers use a spacing disk that should be attached before the knob is installed.
3. Attach the sensor cable and the motor cable to positions J1 and J3 on the PC board (see Figure A7).

**Sensor Removal and Replacement****Removal:**

1. Loosen the two slotted screws from the motor bracket, using a #2 Phillips screwdriver, as shown in Figure A10.
2. Remove the sensor and mounting block, as shown in Figure A11.
3. Remove the two slotted screws from the mounting block, using a #2 Phillips screwdriver.
4. Remove the sensor from the mounting block.

**Figure A10****Figure A11****Replacement:**

1. Place the sensor into the mounting block.
2. Attach the two slotted screws to the mounting block, using a #2 Phillips screwdriver.
3. Place the sensor and mounting block into the motor bracket. See Figure A11.
4. Attach the two slotted screws to the motor bracket, using a #2 Phillips screwdriver, as shown in Figure A10.

## Motor Removal and Replacement

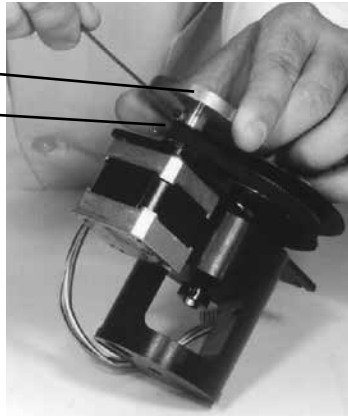
### Removal:

1. Loosen the socket screw from the brass damper using a 1/16 inch Allen wrench. See Figure A12.
2. Remove the damper from the top of the motor shaft, as shown in Figure A13.

**Figure A12**

Damper

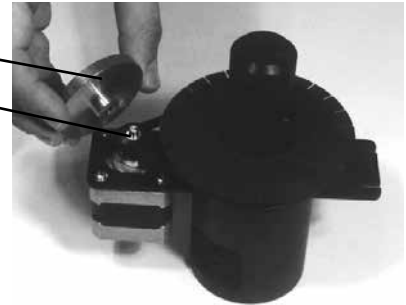
Socket Screw



**Figure A13**

Damper

Motor Shaft

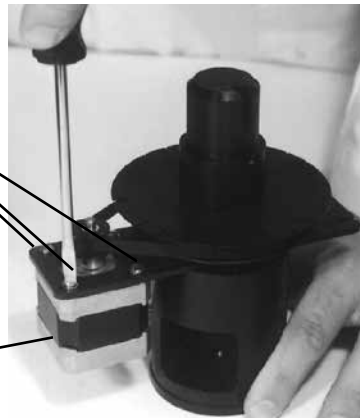


3. Remove the four slotted screws from the top of the motor using a 7/32" flat head screw driver. See Figure A14.
4. Remove the motor from the motor shelf. See Figure A15.

**Figure A14**

Slotted Screws

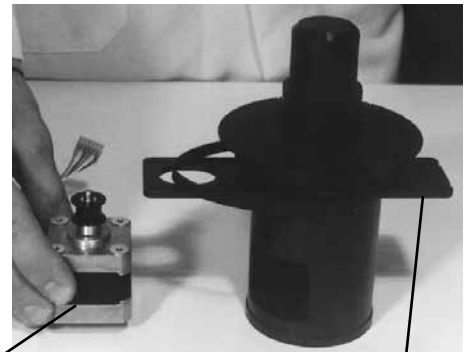
Motor



**Figure A15**

Motor

Motor Shelf



### Replacement:

1. Place the motor into the motor shelf.
2. Pull the belt around the gear of the motor, see Figure A14 for location of gear and belt.
3. Attach the four slotted screws to the top of the motor using a 7/32" flat head screw driver, as shown in Figure A14.
4. Attach the damper to the top of the motor shaft, as shown in Figure A13.
5. Tighten the socket screw to the damper using a 1/16 inch Allen wrench. See Figure A12.

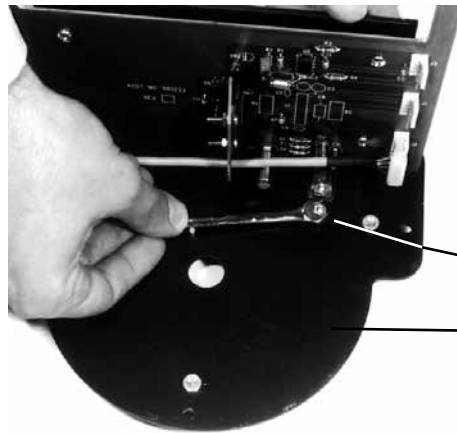
## PC Board Removal and Replacement

### Removal:

1. Disconnect the power cable from the PC board. See Figure A16.
2. Remove the hex nut from the heat-sink plate using a 1/4" open end wrench. See Figure A17.



**Figure A16**



**Figure A17**

Power Cable

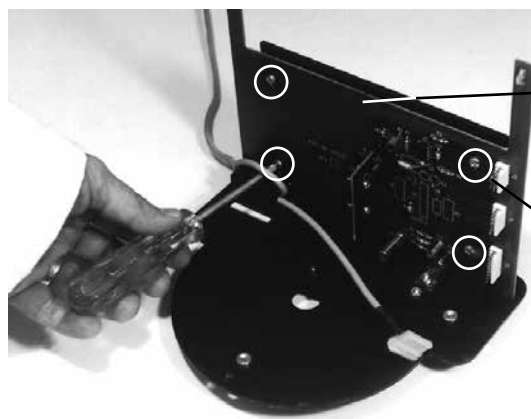
Hex Nut

Heat Sink Plate

3. Remove the four screws from the PC board using a #2 Phillips screwdriver. See Figure A18.



The lower left screw may be hidden by the EMI suppressor box. If so, peel back the tape to reveal the screw.



**Figure A18**

PC Board

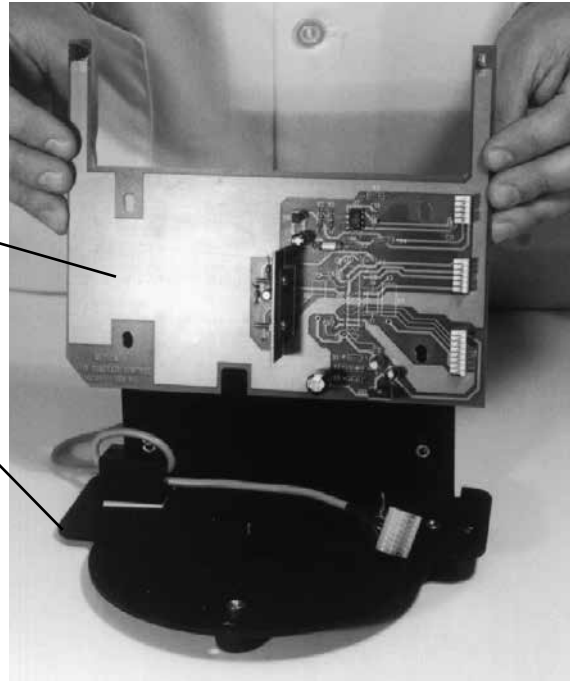
4 Screws

4. Lift the PC Board, as shown in Figure A19, to remove from the base housing. Retain the clear dielectric film pieces from under the heat sink plate.

**Figure A19**

PC Board

Base Housing



### **Replacement:**

1. Place the PC Board, as shown in Figure A19, onto the base housing.
2. Install the four screws to the CPU board using a #2 Phillips screwdriver. See Figure A16.
3. Install the hex nut to the heat-sink plate using a 1/4 inch open end wrench, taking care to place the clear dielectric film pieces under the heat sink. See Figure A17.
4. Connect the power cable to position J2 on the PC board, see Figure A16.

## Specifications (Na/K Na/K/Cl Na/K/Li)

CLIA Classification:	Moderate Complexity
Sample:	Whole Blood, Serum, Plasma or Urine
Sample Size:	100 µL Whole Blood, Serum, Plasma or 400 µL diluted (1:10) Urine, 60 µL capillary
Method:	Direct measurement by Ion Selective Electrode (ISE)

	<b>Na<sup>+</sup></b> (mmol/L)	<b>K<sup>+</sup></b> (mmol/L)	<b>Cl<sup>-</sup></b> (mmol/L)	<b>Li<sup>+</sup></b> (mmol/L)
Detection Range, Blood:	20–200	0.2–40	25–200	0.2–5.0
Detection Range, Urine:	25-1000	1.0-500	25–500	(N/A)
Display Resolution:	0.1	0.01	0.1	0.01
<b>Performance:</b>				
<b>BLOOD, SERUM, PLASMA</b>				
Reproducibility (Typical)	Performed according to a modified NCCLS protocol EP5-T2			
	80-200	1-10	80-200	0.2-2.0
within run (n=20)	C.V. ≤ 0.4%	C.V. ≤ 0.8%	C.V. ≤ 0.5%	SD ≤ 0.01 /mmol/L
between run (10 days)	C.V. ≤ 0.2%	C.V. ≤ 0.7%	C.V. ≤ 1.1%	SD ≤ 0.01 mmol/L
Reproducibility (expected)				
within run (n=20)	C.V. ≤ 1%	C.V. ≤ 2%	C.V. ≤ 2%	SD ≤ 0.3 mmol/L
between run (10 day)	C.V. ≤ 2%	C.V. ≤ 2.5%	C.V. ≤ 2.5%	SD ≤ 0.5 mmol/L
<b>URINE</b>				
Reproducibility (urine std.)	25-1000 mmol/L	1-500 mmol/L	25-500 mmol/L	N/A
within run (n=20)				
C.V. (%)	0.34%	0.50%	1.96%	—
between run (10 day)				
C.V. (%)	3.8%	2.6%	2.4%	—
Reproducibility (expected)				
within run (n=20)	C.V. ≤ 5%	C.V. ≤ 5%	C.V. ≤ 5%	—
between run (10 days)	C.V. ≤ 5%	C.V. ≤ 5%	C.V. ≤ 5%	—
Accuracy (typical)	25-1000 mmol/L	1-500 mmol/L	25-500 mmol/L	—
	n=40	n=40	n=37	—
slope	0.98	0.99	0.99	—
interecept	8.2	1.1	3.7	—
correlations coeff.	1.00	1.00	0.99	—

## SPECIFICATIONS

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Analysis Time:	55 sec. (Blood) / 90 sec. (Urine)
Data Storage:	125 Patient results QC — up to 20 results Normal, Low, and High
Calibration:	Automatic or On-Demand
Output:	128 x 64 pixel graphic display 24 column thermal printer Serial port (RS-232C), EasySampler port
Ambient Conditions:	15-32°C (60-90°F), <85% humidity
Power:	100-240 VAC 50/60 Hz 0.8A
Size & Weight:	9.5"W x 16.5"H x 8.0"D, 13 lbs; 24 cm x 42 cm x 20 cm, 5.8 kg.



## Specifications (Na/K/Ca/pH Na/K/Cl/Ca Na/K/Cl/Li)

CLIA Classification:	Moderate Complexity
Sample:	Whole Blood, Serum, Plasma or Urine as specified
Sample Size:	100 $\mu$ L Whole Blood, Serum, Plasma or 400 $\mu$ L diluted (1:10) Urine
Measuring Temperature:	37.0° $\pm$ 0.1°C (Na/K/Ca/pH only)
Method:	Direct (Undiluted) Measurement Ion Selective Electrode

	<b>Na<sup>+</sup></b> (mmol/L)	<b>K<sup>+</sup></b> (mmol/L)	<b>Cl<sup>-</sup></b> (mmol/L)	<b>Li<sup>+</sup></b> (mmol/L)	<b>Ca<sup>++</sup></b> (mmol/L)	<b>pH</b> (units)
Detection Range:	20-200	0.2-40	25-200	0.2-5.0	0.1-6.0	6.0-8.0
Detection Range Urine:	25-1000	1-500	25-500	N/A	N/A	N/A
Resolution:	0.1	0.01	0.1	0.01	0.01	0.005

### Performance:

#### BLOOD, SERUM, PLASMA

Reproducibility (typical)	Performed according to a modified NCCLS protocol EP5-T2					
	80-200	1-10	80-200	0.2-2.0	0.4-1.5	6.8-8.0
within run (n=20)	C.V.<1%	C.V.<2%	C.V.<2%	S.D.< 0.3	S.D.< 0.02	S.D.< 0.01
between run (10 day)	C.V.<2%	C.V.<2.5%	C.V.<2.5%	S.D.< 0.5	S.D.< 0.03	S.D.< 0.02
Reproducibility (expected)						
within run (n=20)	C.V.<1%	C.V.<2%	C.V.<2%	S.D.< 0.3	S.D.< 0.02	N/A
between run (10 day)	C.V.<2%	C.V.<2.5%	C.V.<2.5%	S.D.< 0.5	S.D.< 0.03	N/A

Calculated Analyte: Normalized Ca<sup>++</sup> (at pH 7.40) for samples within pH range of 7.20- 7.60 units.

<b>URINE</b>	<b>Na<sup>+</sup></b>	<b>K<sup>+</sup></b>	<b>Cl<sup>-</sup></b>	<b>Li<sup>+</sup>/Ca<sup>++</sup>/pH</b>
Reproducibility (urine std.)	25-1000 mmol/L	1-500 mmol/L	25-500 mmol/L	N/A
within run (n=20)				
C.V. (%)	0.34%	0.50%	1.96%	—
between run (10 day)				
C.V. (%)	3.8%	2.6%	2.4%	—
Reproducibility (expected)				
within run (n=20)	C.V. $\leq$ 5%	C.V. $\leq$ 5%	C.V. $\leq$ 5%	—
between run (10 days)	C.V. $\leq$ 5%	C.V. $\leq$ 5%	C.V. $\leq$ 5%	—
Accuracy (typical)	25-1000 mmol/L	1-500 mmol/L	25-500 mmol/L	—
	n=40	n=40	n=37	—
slope	0.98	0.99	0.99	—
intercept	8.2	1.1	3.7	—
correlations coeff.	1.00	1.00	0.99	—

## SPECIFICATIONS

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Analysis Time:	55 sec. (Blood) / 90 sec. (Urine)
Data Storage:	125 Patient results QC — up to 20 results Normal, Low, and High
Calibration:	Automatic or On-Demand
Output:	128 x 64 pixel graphic display 24 column thermal printer Serial port (RS-232C), EasySampler port
Ambient Conditions:	15-32°C (60-90°F), <85% humidity
Power:	100-240 VAC 50/60 Hz 0.8A
Size & Weight:	9.5"W x 16.5"H x 8.0"D, 13 lbs; 24 cm x 42 cm x 20 cm, 5.8 kg.

## Appendix A

### Display Messages

"!!"	Na/K/Cl result(s) out of analyzer measurement range.
*****	Result not reported because electrode is not calibrated.
ABNORMAL CONTROL?	Allows operator to select analysis of abnormal control.
ABNORMAL STATS?	Allows operator to display or print statistics for stored abnormal control results.
AIR IN CLEANER	Cleaning solution not detected correctly.
AIR IN CONTROL	Control sample not detected correctly.
AIR IN SAMPLE	Sample not detected correctly.
AIR IN STD A	Standard A not detected correctly.
AIR IN STD B	Standard B not detected correctly.
AIR IN FLUSH	Flush not detected correctly.
ALL ABNORMAL?	Allows operator to delete all stored abnormal control results.
ALL NORMAL?	Allows operator to delete all stored normal control results.
ALL RESULTS?	Allows operator to display all stored results.
ANALYZE BLOOD?	Sample analysis mode for Blood, Serum or Plasma. The message will only appear when the analyzer is calibrated.
*ANALYZE URINE?*	Urine analysis mode for Na/K/Cl results only.
ANALYZING...	Analyzer is measuring sample.
ASPIRATING...	Sample is being drawn into probe.
AUTOCAL?	Allows operator to activate and to set time for initial daily calibration.
BLOOD Cl LIMITS?	Allows operator to set normal Cl range.
BLOOD K LIMITS?	Allows operator to set normal K range.
BLOOD Li LIMITS?	Allows operator to set normal Li range.
BLOOD NA LIMITS?	Allows operator to set normal Na range.
CAL VALUES?	Allows operator to display last calibration values.
CALIBRATE NOW?	Allows operator to calibrate analyzer.
CALIBRATING...	Analyzer is calibrating.
CALIBR'TING STD A	Electrodes being calibrated in relation to Standard A.
CALIBR'TNG STD B	Electrodes being calibrated in relation to Standard B.
CHANGE DAY/TIME?	Allows operator to change date and time.
CHANGE PACK!	Occurs at 99% pack usage. Pack must be replaced!
CLEANING...	Analyzer is performing daily cleaning.
CLEAR ALL DATA?	Allows operator to clear all stored patient results, QC results and user settings before switching between calcium and lithium testing modes.
Cl HIGH...	Chloride result obtained is higher than the preset normal range (flashing display).

CL LOW...	Chloride result obtained is lower than the preset normal range (flashing display).
CONTINUE?	Analyzer requests confirmation to proceed.
C.V. VALUES?	Allows operator to display % C.V.'s of Quality Control results.
DAILY CLEANER?	Allows operator to perform daily cleaning.
DAILY SUMMARY?	Allows operator to print summary of daily results.
*DATE/RANGES?*	Allows operator to set date, time, and ranges.
DELETE CONTROLS?	Allows operator to delete stored control results from memory.
DELETE RESULTS?	Allows operator to delete patient sample results from memory.
*DIAGNOSTICS?*	Allows operator to check key analyzer functions.
DILUTED 1:10?	Analyzer requests confirmation that urine sample has been diluted.
DRIFT CL	Chloride electrode is drifting outside of preset electrode operating range.
DRIFT K	Potassium electrode is drifting outside of preset electrode operating range.
DRIFT Li	Lithium electrode is drifting outside of preset electrode operating range.
DRIFT NA	Sodium electrode is drifting outside of preset electrode operating range.
DRIFT, RECAL..	Analyzer is automatically recalibrating because of electrode drift.
ELECTR'D VALUES?	Allows operator to display real time electrode millivolt readings.
ENTIRE SUMMARY?	Allows operator to display summary of all results in storage.
***ERROR***	Denotes an error has occurred. Press YES or NO to determine error.
FLOW TEST FAIL	Unsuccessful Fluid Flow Test.
FLUID FLOW OK	Successful Fluid Flow Test.
FLUID FLOW TEST?	Allows operator to run red Test Dye to check fluid flow.
FLUID PATH!	Analyzer is not detecting fluid and/or air segments when expected.
FLUSH?	Allows operator to perform a Flush cycle on demand.
FLUSHING...	Analyzer is flushing electrodes.
FLUSH, RECAL ...	If calibration fails, analyzer does a Flush and recalibration automatically.
I.D. #- - -	Allows operator to assign an identification number to patient result.
K HIGH...	Potassium result obtained is higher than preset normal range (flashing display).
K LOW...	Potassium result obtained is lower than preset normal range (flashing display).
LAST CONTROL?	Allows operator to display last control result.
LAST RESULT?	Allows operator to display last analysis result.
Li BELOW 0.2mM/L	Lithium sample concentration is below EasyLyte measurement range.
Li HIGH..	Lithium result obtained is higher than the preset normal range (flashing display).
Li LOW...	Lithium result obtained is lower than the preset normal range (flashing display).
MEAN VALUES?	Allows operator to display mean values of quality control results.

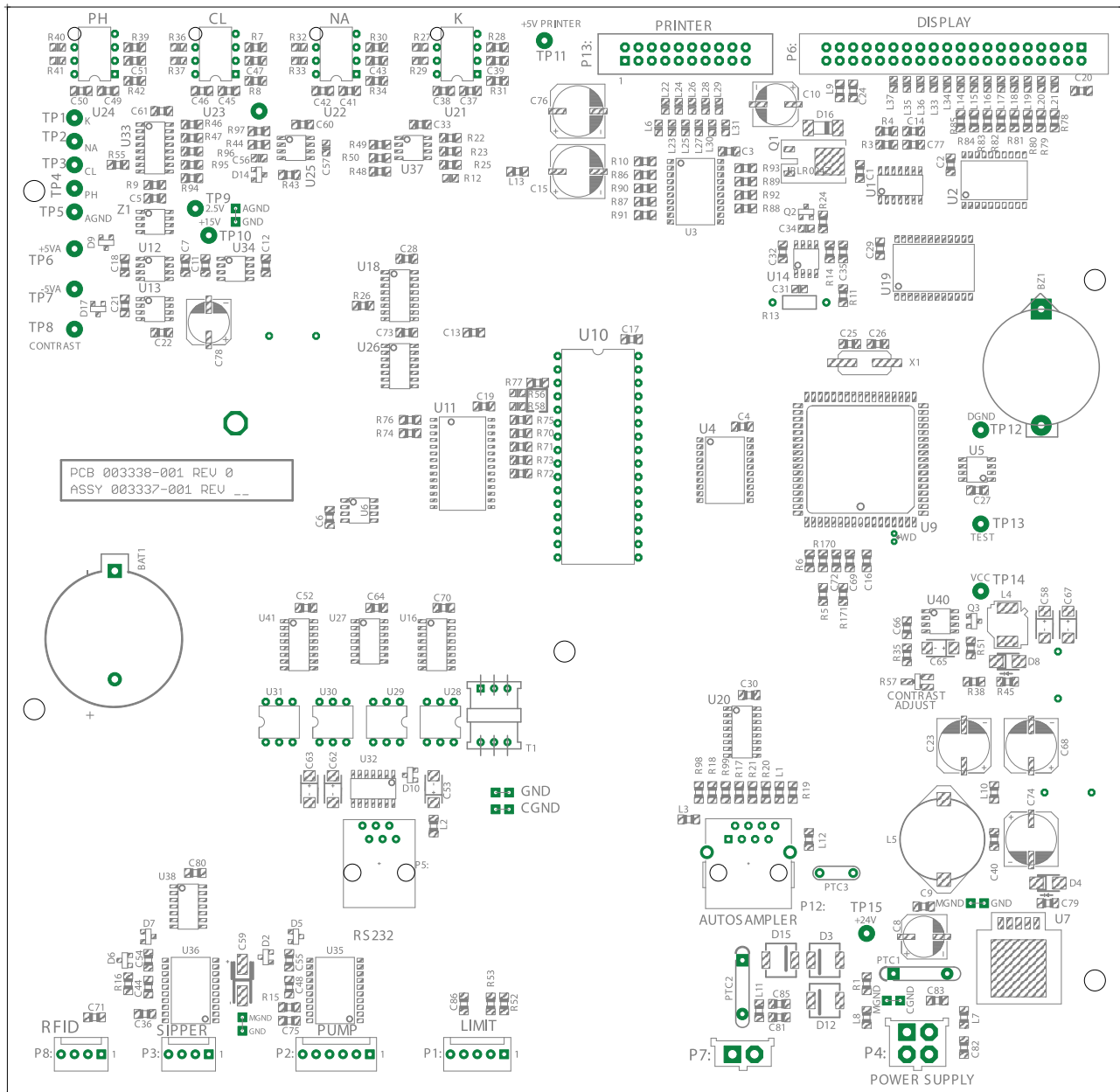
MTP	Mechanical problem with pump.
MTS	Mechanical problem with probe.
MUST USE CLEANR!	Cleaning Solution must be used before operating the analyzer.
MV RANGE Cl	Measured Chloride electrode voltage is outside operating limits.
MV RANGE K	Measured Potassium electrode voltage is outside operating limits.
MV RANGE Li	Measured Lithium electrode voltage is outside operating limits.
MV RANGE Na	Measured Sodium electrode voltage is outside operating limits.
NA HIGH...	Sodium result obtained is higher than the preset normal range (flashing display).
NA LOW...	Sodium result obtained is lower than the preset normal range (flashing display).
**NA/K** or **Na/K/Cl** or **Na/K/Li**	
	Appears when power is connected or restored after interruption.
Na/K/Cl or Na/K/Li RANGE?	Allows operator to set normal ranges.
NEW PACK INSTLD?	Asks operator to confirm that a new pack has just been installed.
NEXT SAMPLE?	Allows operator to proceed to next analysis.
NOISE	Erratic signal coming from electrodes.
NOISE, RECAL..	Analyzer automatically recalibrates after detecting noise.
NORMAL CONTROL?	Allows operator to select analysis of normal control.
NORMAL STATS?	Allows operator to display or print statistics for stored normal control results.
NOT ENOUGH DATA!	In order to calculate statistics, the Analyzer requires 5 stored control results of both normal and abnormal levels.
*OPER FUNCS?*	Allows operator to select "On Demand" flush, purge or calibration functions.
*PACK USAGE?*	Allows operator to display % pack expended.
PATIENT ID#?	Allows operator to assign identification number to patient's result.
% OF PACK USED	Percentage of solutions pack that has been expended.
PRINT ALL DATA	Allows operator to print all stored patient results, QC results and user settings before switching between calcium and lithium testing modes.
PRINTER OFF?	Allows operator to turn printer function on or off.
PRINTING...	Printer is printing requested data.
PRINT RESULTS?	Allows operator to print all results stored in memory.
PRINT STAT'TICS?	Allows operator to print normal or abnormal control summaries.
PRINT SUMMARY?	Prints daily summary of results.
PRINT WKLY SUM?	Prints summary of last five days results.
PROBE IN BLOOD?	Requests operator to confirm that probe is in blood.
PROBE IN CLEANR?	Requests operator to confirm that probe is in daily cleaning solution.
PROBE IN CONTROL?	Requests operator to confirm that probe is in control sample.
PROBE IN DYE?	Requests operator to confirm that probe is in Test Dye solution.

PROBE IN URINE?	Requests operator to confirm that probe is in urine.
PROBE IN FLUSH?	Requests operator to confirm that probe is in Flush Solution.
PROBE WIPING?	Allows operator time to manually wipe the probe after sample is removed.
PUMP CAL...	Pump is being calibrated.
PUMPCAL FAILURE!	Failure of Pumpcal Test.
PUMPCAL OK	Successful completion of Pumpcal Test.
PUMPCAL TEST?	Allows operator to test pump calibration.
PURGING STD A	Standard A fluid line is being purged.
PURGING STD B	Standard B fluid line is being purged.
PURGING FLUSH	Flush Solution fluid line is being purged.
*QUAL CONTROL?	Allows operator to choose quality control functions.
REMOVE CONTROL	Requests operator to remove control sample from probe.
REMOVE SAMPLE	Requests operator to remove sample from probe.
RESET TO 0%?	Sets pack usage percentage counter to 0%.
RUN CONTROL?	Quality control analysis mode.
SAMPLE CAL...	Analyzer is calibrating the Sample Detector.
SAMPLE DETECT OK	Successful completion of Sample Detector Test.
SAMPLE DETECTOR!	Sample Detector readings out of range.
SAMPLE DET. TEST?	Allows operator to test sample detector.
S.D. VALUES?	Allows operator to display Standard Deviation values of Quality control results.
*SECOND MENU?*	Allows operator access to secondary menu.
SEE MANUAL!	See Operator's Manual for assistance or explanation.
*SEE RESULTS?*	Allows operator to display or print stored results.
SEE STATISTICS?	Allows operator to display Mean, S.D., C.V. values of Quality Control results.
SET CORRELATION?	Allows operator to select dilution equivalent correlations.
SOL'N PACK LOW!	Appears when solutions pack is 88% expended. Continue operating analyzer.
SOL'N PURGE?	Allows operator to purge air from fluid lines.
***STANDBY***	Appears when Analyzer is in Standby mode.
STANDBY IN 1 MIN	Analyzer will go into standby in 1 minute (Flashing Display).
STANDBY MODE?	Allows operator to put analyzer in standby mode to conserve fluids.
STATISTICS?	Allows operator to display statistics for all control results.
STORE RESULT?	Allows operator to store results in memory.
SWITCH TO Ca?	Allows operator to switch to calcium testing mode.
SWITCH TO Li?	Allows operator to switch to lithium testing mode.
SYRINGE SAMPLE?	Allows operator to adjust probe extension during analysis to accommodate a syringe.
TESTING...	Analyzer in process of completing a Fluid Flow Test.

TRY PURGE AGAIN?	Allows operator to perform additional purge after initial failure.
URINE Cl LIMITS?	Allows operator to set normal Cl range for urine.
URINE K LIMITS?	Allows operator to set normal K range for urine.
URINE Na LIMITS?	Allows operator to set normal Na range for urine.
USE EXT. FLUSH!	Flush solution in pack is empty. Operator should use external flush.
USER OPTIONS	Allows operator to access the following functions: Probe wiping, Patient I.D. #, Syringe Sample, Set Correlation, EasySampler and Printer Off.
USER SETTINGS ONLY?	Allows operator to print user settings before switching between calcium and lithium testing modes.
WEEKLY SUMMARY?	Allows operator to print last five days of stored results.
WIPE PROBE	Allows operator time to wipe off sample from exterior of probe.
400 mL PACK?	Allows operator to select for correct solutions pack size.
800 mL PACK?	Allows operator to select for correct solutions pack size.
QC TEST?	Flowchart (Service Diagnostics)

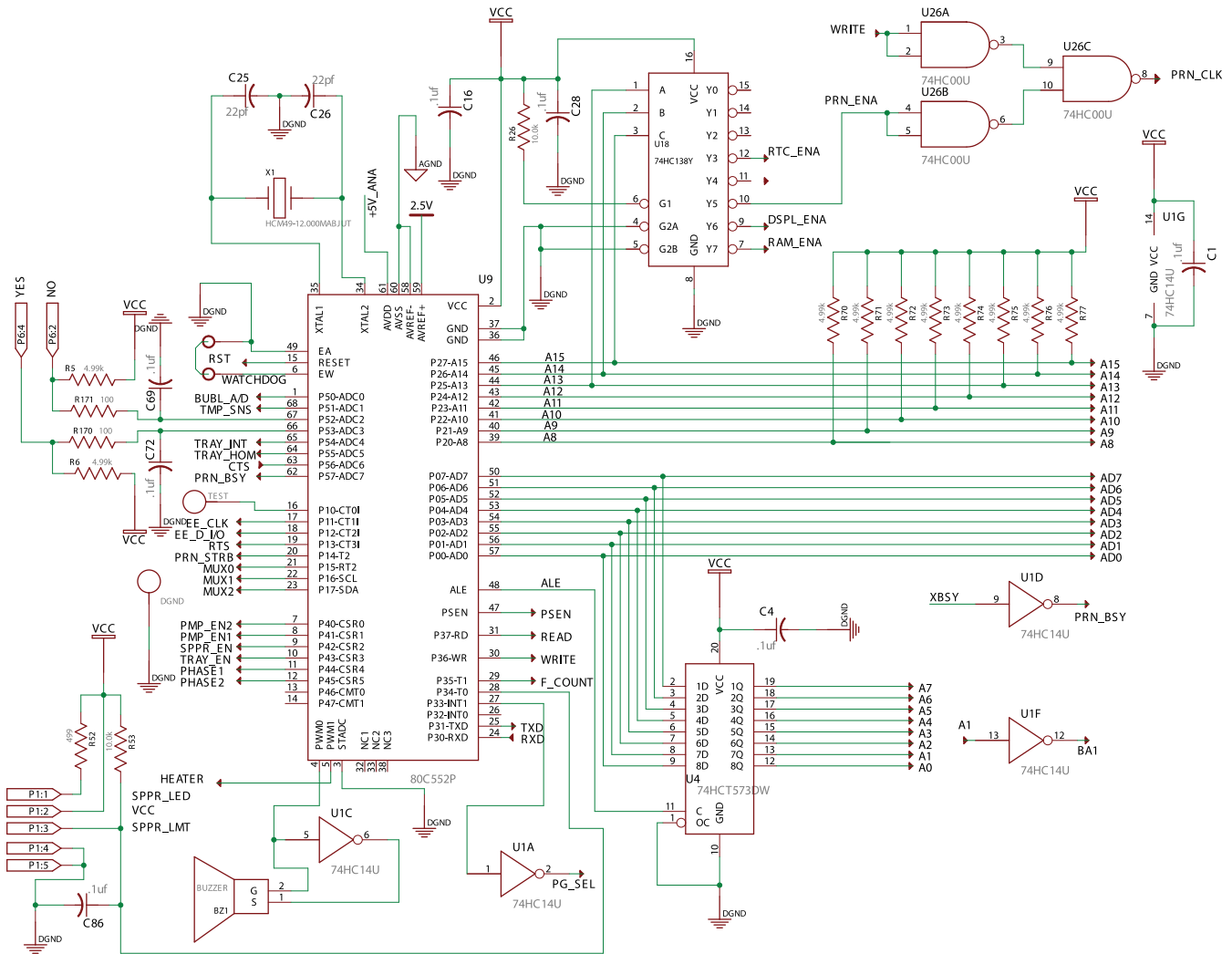
## Appendix B

### Board Layout

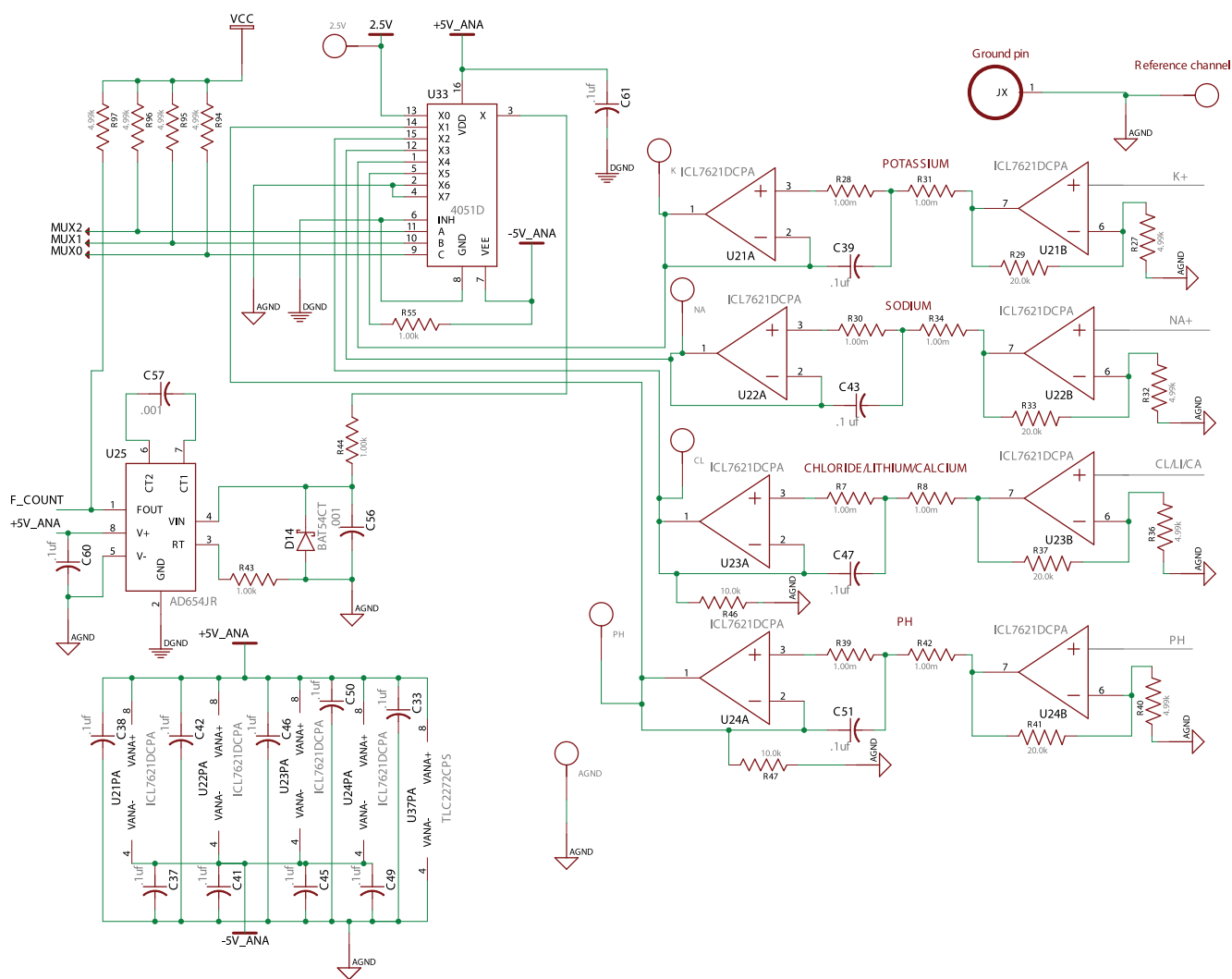


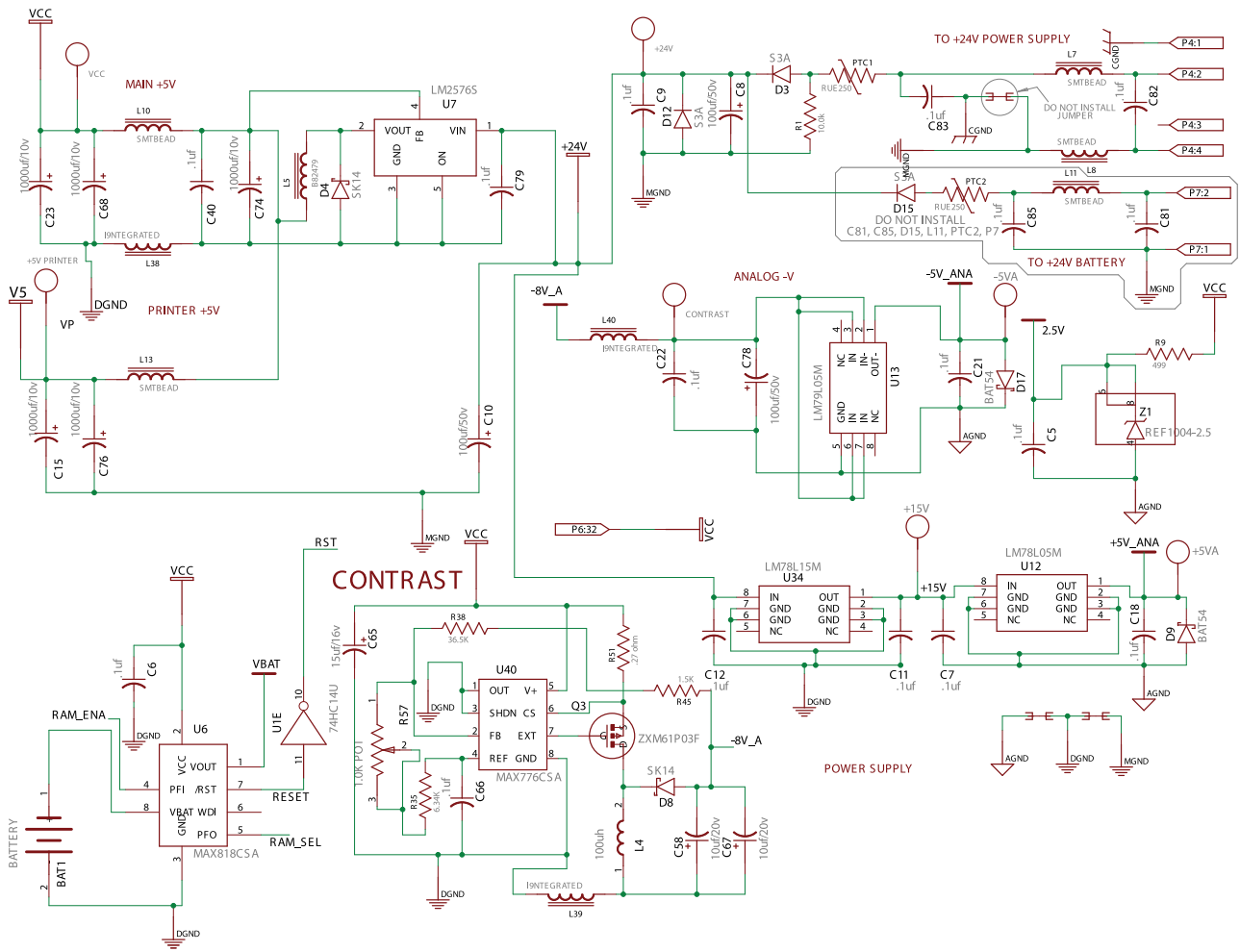


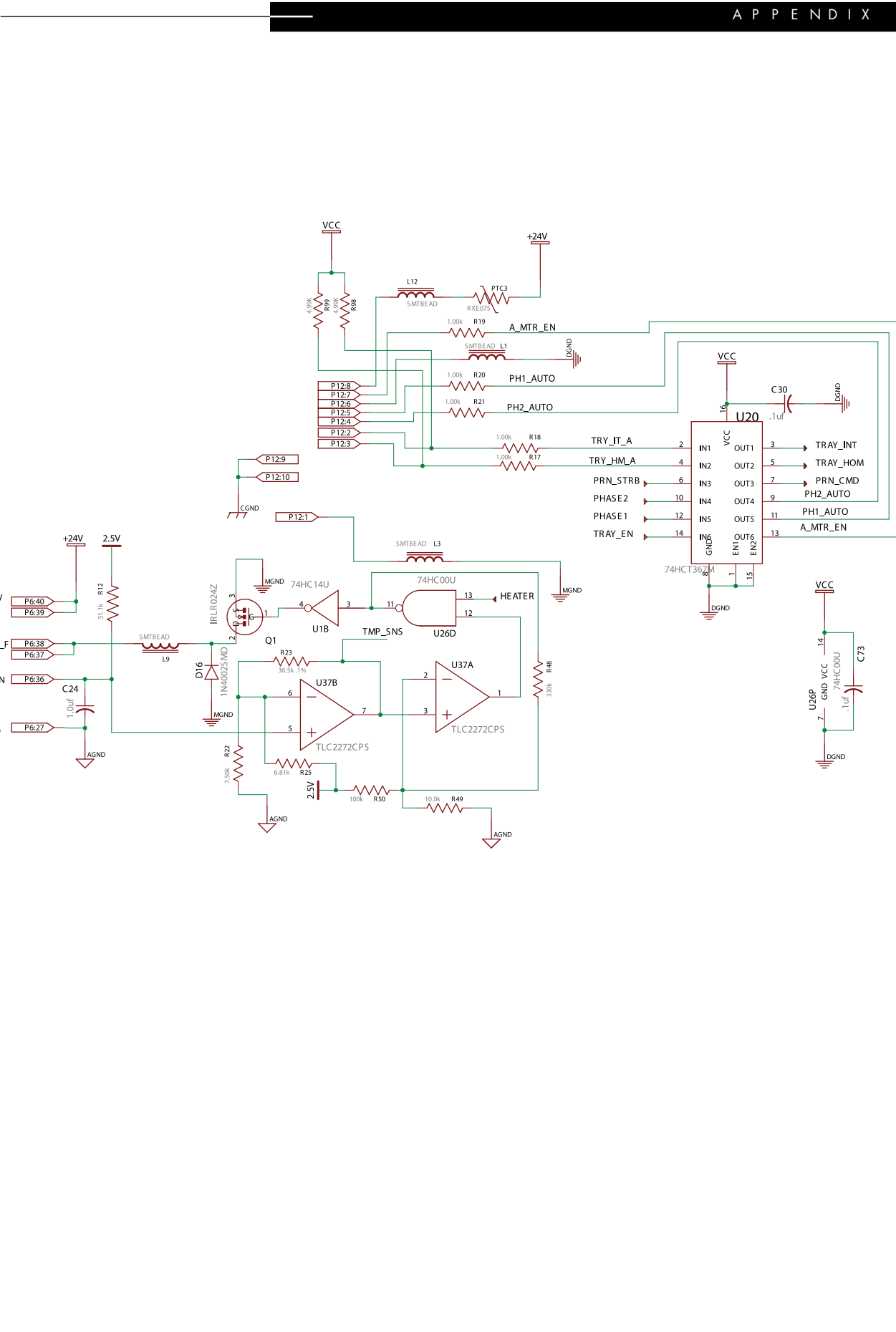
## Main PCB Schematics



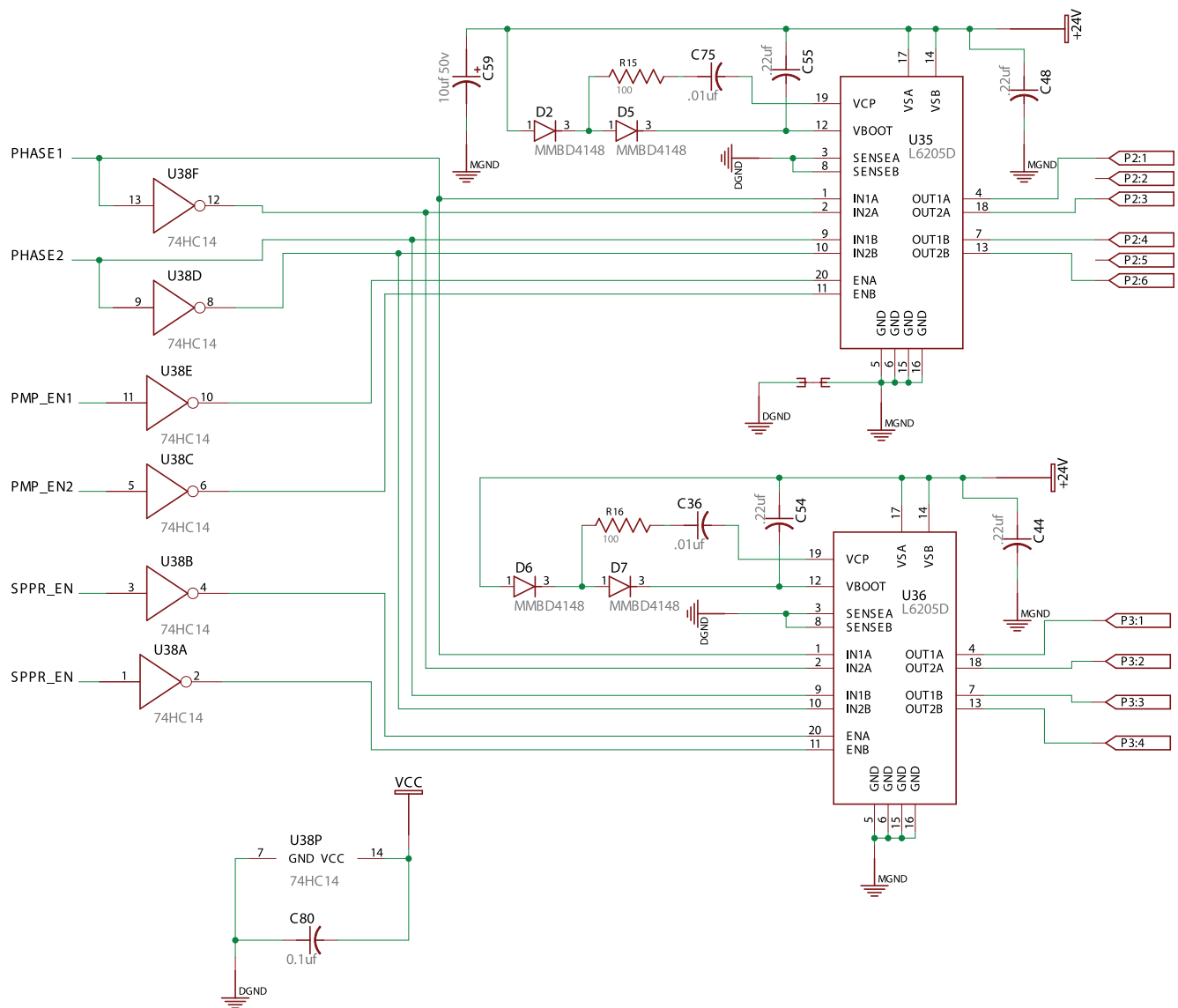


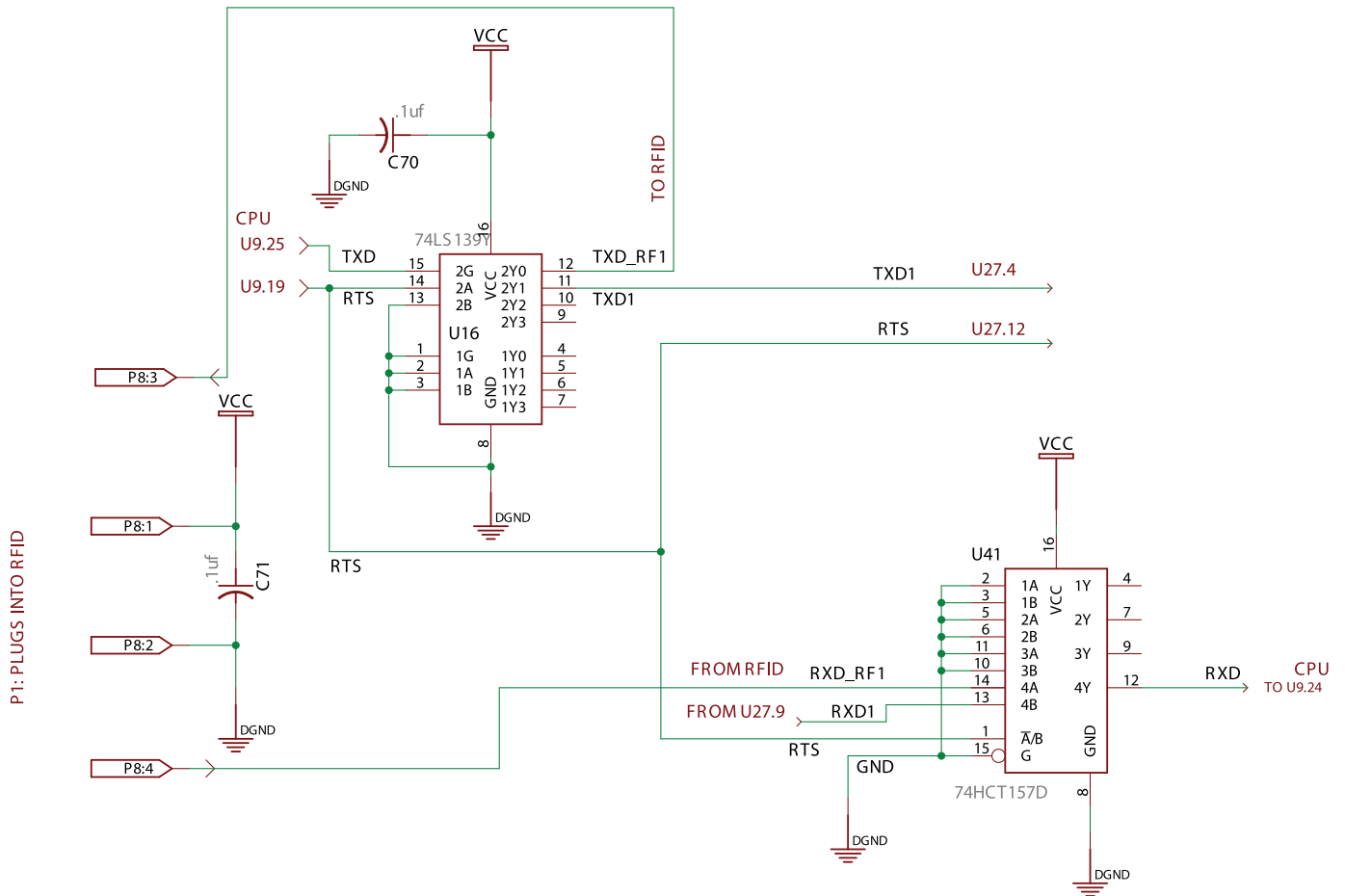








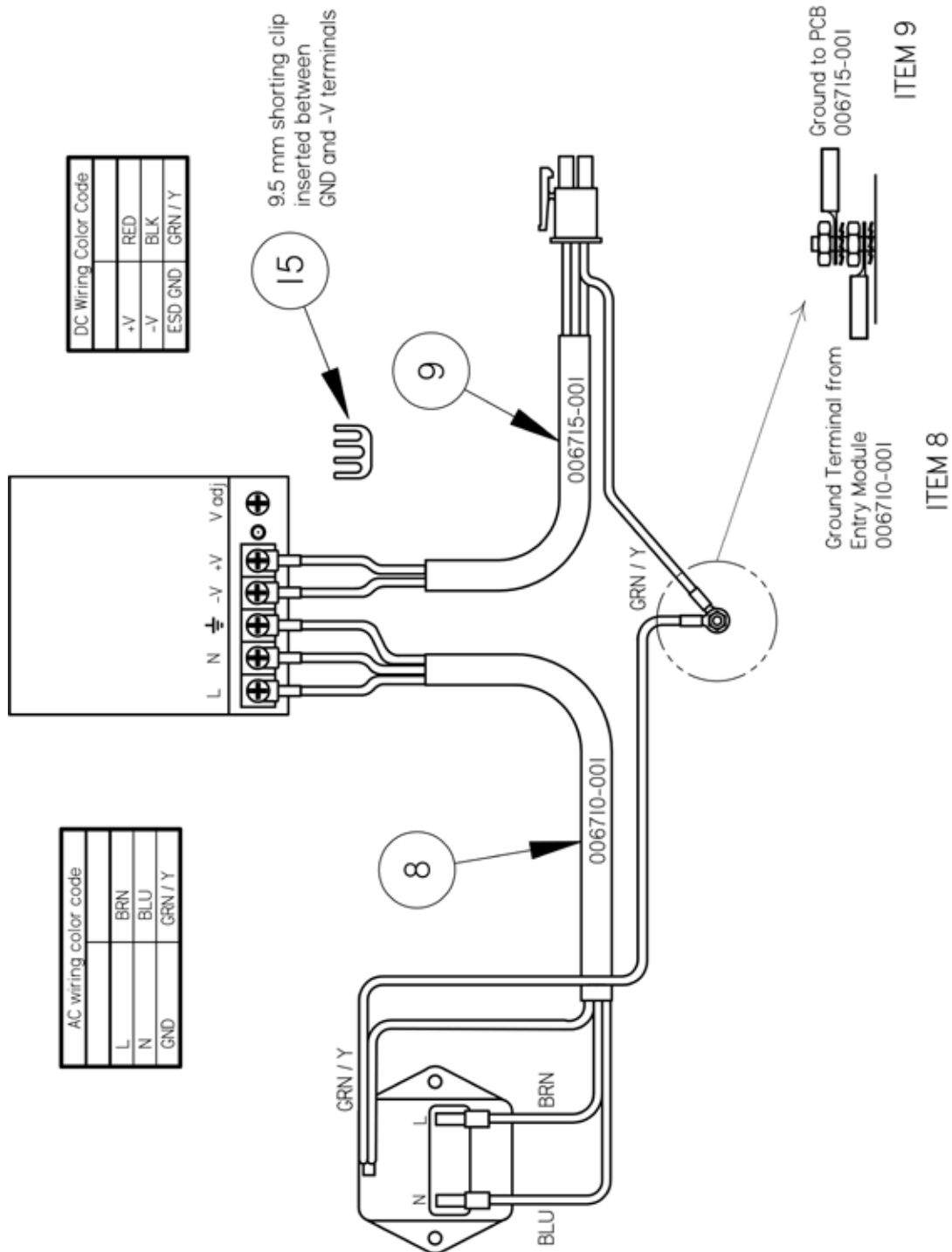




RTS	SELECT
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## Power Supply







For Service or Technical Assistance call:

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