Service Manual

*Rapid*chem™ 700

Bayer

Flow Chart

```
                                        ┌----------------------┐
                                        ¦     CALIBRATE?       ¦
                                        └----------------------┘
                                                  │
                                                (yes)
                                                  │
                                                  ▼
                                        ┌──────────────────────┐
                                        │   ANALYZE SAMPLE?    │◄──────┐
                                        └──────────────────────┘       │
                                           (yes)      (no)             │
                                             │          │              │
                                             ▼          │              │
                                   ┌──────────────────┐ │              │
                                   │ LIFT SAMPLER TO  │ │              │
                                   │     ANALYZE      │ │              │
                                   └──────────────────┘ │              │
```

┌──┐
│ *Whole Blood, Serum, or Plasma Analysis*   │
└──┘

```
                                              (no)             │
                                        ┌──────────────────────┐
                                        │   DAILY CLEANER?     │◄─────┘
                                        └──────────────────────┘
                                           (yes)      (no)
```

┌──┐
│ *End of Day Cleaning*   │
└──┘

```
                                        ┌──────────────────────┐
                                        │     ANALYZE QC?      │
                                        └──────────────────────┘
                                           (yes)      (no)
```

┌──┐
│ *Analyze Level 1, Level 2, Level 3 Controls*│
└──┘

```
                                        ┌──────────────────────┐
                                        │     CALIBRATE?       │
                                        └──────────────────────┘
                                           (yes)      (no)
```

┌──┐
│ *Calibration*   │
└──┘

```
                                        ┌──────────────────────┐
                                        │    SECOND MENU?      │◄─────┐
                                        └──────────────────────┘      │
                                           (yes)      (no)────────────┘
                                             │
                                             ▼
                                        ┌----------------------┐
                                        ¦    ANALYZE URINE?    ¦
                                        └----------------------┘
                                           (yes)      (no)
```

┌──┐
│ *Urine Analysis*   │
└──┘

```
                                        ┌----------------------┐
                                        ¦      STANDBY?        ¦
                                        └----------------------┘
                                           (yes)      (no)
```

┌──┐
│ *Fluid Conservation, Maintenance*   │
└──┘

```
                                        ┌----------------------┐
                                        ¦      REPLACE         ¦
                                        ¦    COMPONENTS?       ¦
                                        └----------------------┘
                                           (yes)      (no)
```

┌──┐
│ ***Replace:*** *Valve Module, Replace Others*│
└──┘

```
                                        ┌----------------------┐
                                        ¦     DIAGNOSTICS?     ¦
                                        └----------------------┘
                                           (yes)      (no)
```

┌──┐
│ *Test Fluidics, Test Components, Sensor Status, Prime Fluids* │
└──┘

```
                                        ┌----------------------┐
                                        ¦      STORED          ¦
                                        ¦   INFORMATION?       ¦
                                        └----------------------┘
                                           (yes)      (no)
```

┌──┐
│ ***View:*** *Patient Results, QC Results, Calibration Data,* │
│   *Reagent Module Status;*   │
│ ***Print:*** *Setup*   │
└──┘

```
                                        ┌----------------------┐
                                        ¦     SETUP MENU?      ¦
                                        └----------------------┘
                                           (yes)      (no)
```

┌──┐
│ ***Set:*** *User Options, Configuration,*   │
│   *Calibration Options, Reference Limits;* │
│ ***Delete:*** *Patient/QC Data;*   │
│   *Adjust Display*   │
└──┘

Table of Symbols

▲　　Important information

★　　Conditions which may cause data loss or analyzer malfunction

　　　Biohazard warning

　　　Electrical hazard

Service Manual Contents

Product Description

Troubleshooting

Repair

System Overview

The repairs and procedures in this manual are intended for authorized field service engineers. Instructions describe the repair or replacement of all modular internal components. It is recommended that the field service engineer also refer to the Operator's Manual for detailed instructions on operating and troubleshooting the analyzer to determine if repair or replacement is necessary for an internal component. The Replacement List indicates assemblies and components available to the field service engineer. Refer to the Repair section of this manual for the CPU schematics.

All components should be considered biohazardous (contaminated with HIV or other pathogens).

Any replaceable component which comes in contact with biological samples, including the sampler, sensors, sensor module, pump tubing, valve module and reagent module may contain contaminated material. Treat all components, during use and disposal, as you would any biohazardous material.

Sensor Module

Contains sampler position sensors, bubble detector, door sensor, sampler, and compression plate. The Sensors Na^+, K^+, Cl^- or Li^+, spacer, and reference sensors are housed in the sensor module.

Sampler

Attached to sensor module. Contains sample probe with probe wiper. The sampler is removable from the sensor module as a replacement part.
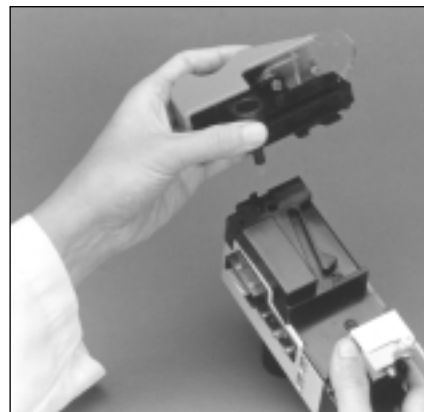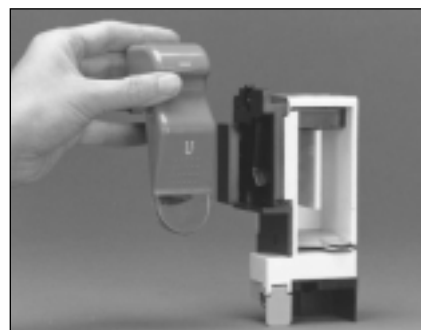
Valve Module

Controls reagent (from reagent module) or air selection. The valve module contains a ceramic valve, motor, position detector. There are no serviceable parts inside the valve module.
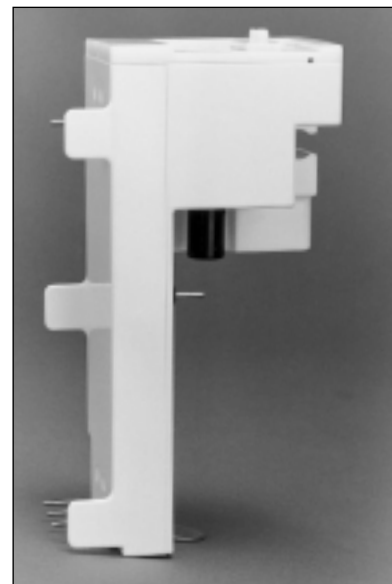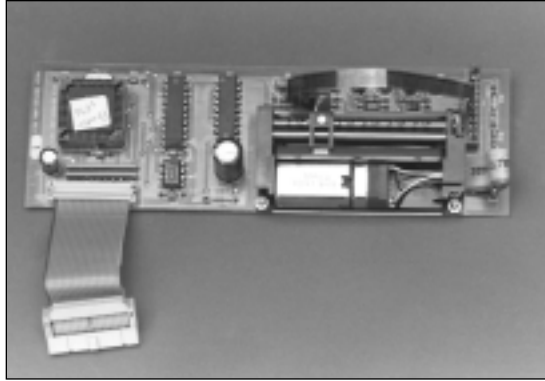
Printer Assembly

Contains the printer mechanism, printer software, and printer electronics. Prints analysis, calibration and diagnostic data.
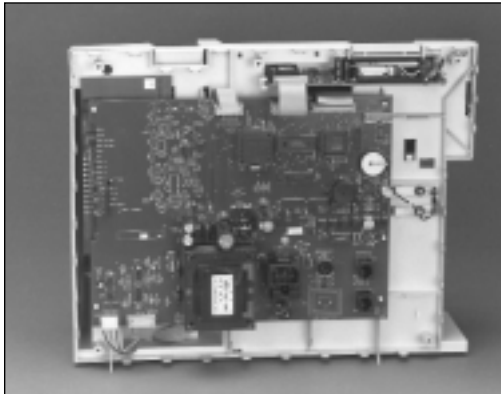
CPU Assembly

Contains transformer, software, inputs (sensors), motor control circuitry, and 2 serial ports.
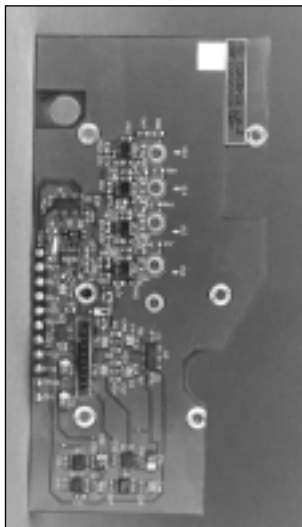
Pre-amp PC Board

Connects contact housing to the CPU assembly and amplifies sensor signals.
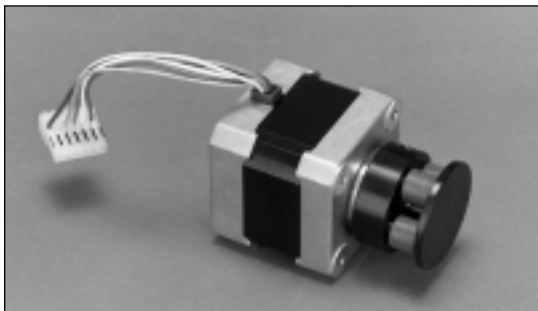
Pump Assembly

Contains peristaltic pump with wire connector.

Contact Housing

Contains all contacts from the sensors, as well as the contact housing cable for connection to the CPU assembly.

Display Assemblies

(Analyzer operator interface.) Contains operator keypad and LCD display.

Numeric display
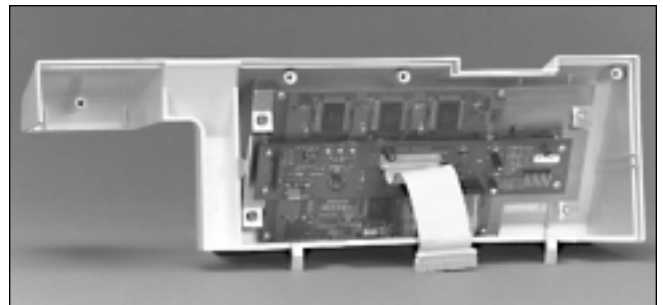
Graphic display
(required for certain languages)

4
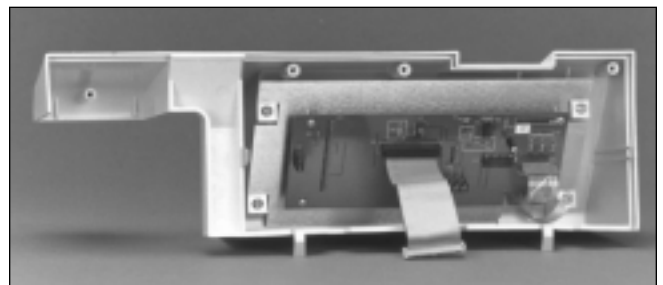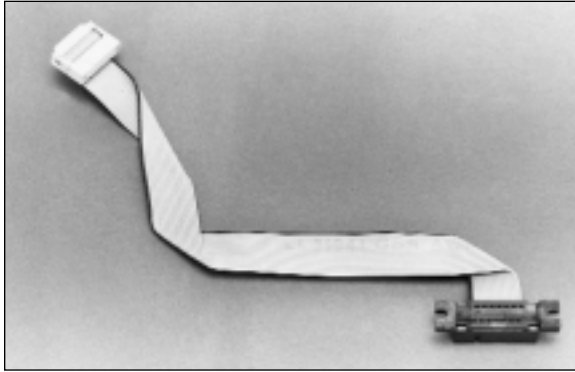
Valve Module Cable

Connects valve module to the CPU board.
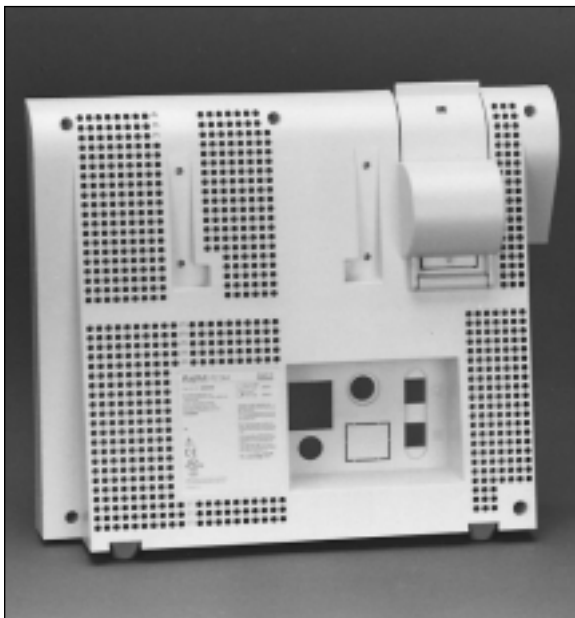
Rear Housing Assembly

Rear housing contains the printer paper bay and cover, serial number label, and the openings for the fuse holder, AC power cord socket, battery connection, RS-232 serial interface connection, barcode reader connection, and power voltage setting.

Troubleshooting Overview

This section describes troubleshooting the mechanical and electrical functions of the Rapidchem analyzer. Bayer recommends that dealers maintain an inventory of operational test assemblies for troubleshooting purposes. These test assemblies can substitute the questionable assemblies to confirm failures. For information on troubleshooting the fluidic system and sensors, refer to the Rapidchem Operator's manual.

▲   Run quality control material after any troubleshooting procedure.

▲   When removing or handling PC boards, it is necessary to be properly grounded to prevent static damage.

Troubleshooting Guide

Determine the problem and corrective action needed.

Problem/Description	Problem Source	Corrective Action Steps
Blank display/No response	Power malfunction Defective display	AC power verification DC power verification Display assembly verification Flash Device verification
Printer does not print	Printer malfunction	Printer verification
No pump movement	Pump motor malfunction	Pump verification
No valve movement	Valve motor malfunction	Valve verification
Sensor voltages out of specification	Sensors or signal input malfunction	Check sensor module installation and performance Sensor signal input verification
Serial transmission failure	Serial cable Transmission Protocol	Serial communication verification

AC Power Verification

When the power is first turned on, the Rapidchem analyzer will "beep," and the display will light up. If this fails to happen, follow the verification procedure in this section. Review this entire section before replacing any components. First confirm that the power cord is inserted securely inside the AC power cord socket.

⚠️ **Warning: Careless handling of AC power can be hazardous or fatal. Only qualified personnel should work with AC power.**

Fuse Holder   AC Power Cord Socket
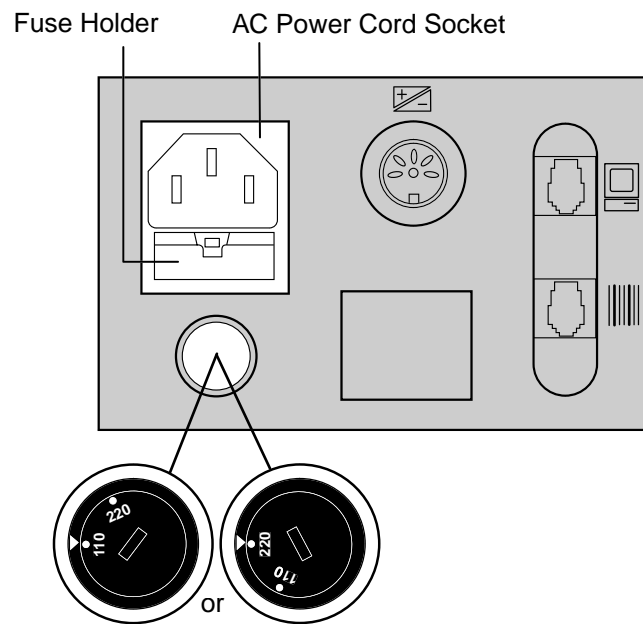
Factory-set Power Voltage Setting

1   Remove the power cord from the AC power cord socket.

2   Verify that the voltage selector switch voltage setting (110V or 220V) matches the power outlet voltage. If it does not, correct the setting.

★ **3**   Verify that the fuses have the correct rating. Push down on the fuse holder release tab and pull the fuse holder straight out. Inspect both fuses.

- For 110V analyzers, the fuses must be rated 0.8A, 250 volts

- For 220V analyzers, the fuses must be rated 0.4A, 250 volts

F0.8 or F0.4
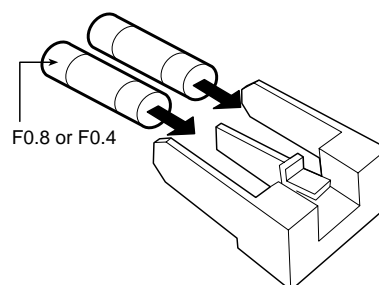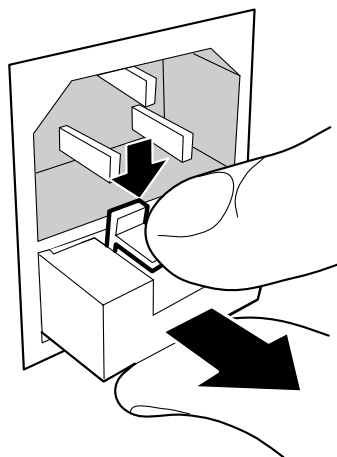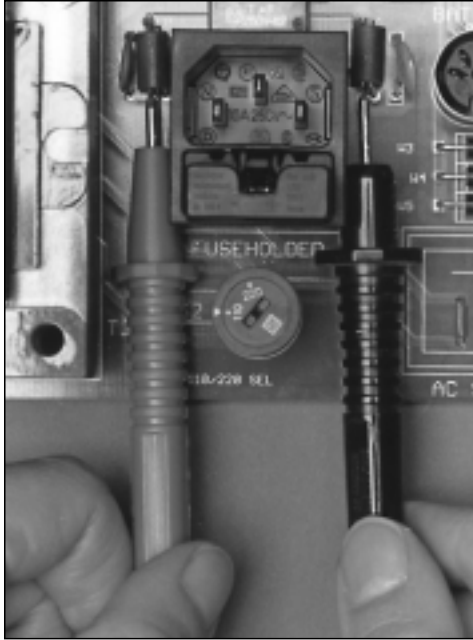
Remove the fuses from the fuse holder. Using a standard ohmmeter, measure continuity between the ends of each fuse. Replace defective fuses.

If the voltage setting and the fuses are correct, but "no power" or "blank display" continues, proceed as follows:

4 Remove the rear housing. *See Rear Housing Removal in the* **Repair** *section for instructions.*

5 Reinstall the power cord (cord not shown).

6 Measure the voltage between the bottom sides of components L7 and L8 on the CPU assembly using a standard voltmeter. Refer to picture.

• For 110V analyzers, the measured voltage must be 100/120V $\pm$ 10%

• For 220V analyzers, the measured voltage must be 230V $\pm$ 10%

If no voltage, check the power cord and outlet. If the measured voltage is incorrect, replace the CPU assembly. *See CPU Assembly Removal / Installation in the* **Repair** *section for instructions.*

DC Power Verification ⚡

1 Remove the rear housing. *See Rear Housing Removal in the* **Repair** *section for instructions.*

2 Remove sensor module.

3 Connect the power cord to an electrical outlet, then to the AC power cord socket.

4 Connect the reference side of the voltmeter to X8 on the CPU board.

5 Verify the voltage at each test point listed in Table 1.

6 Connect the reference side of the voltmeter to X2 on the CPU board.

7 Verify the voltage at each test point listed in Table 2.

8 Connect the reference side of the voltmeter to TP9 on the pre-amp PC board.

9 Verify the voltage at each test point listed in Table 3.

★ No adjustments are permitted. Failed boards should be replaced. *See CPU Assembly Removal / Installation in the* **Repair** *section for instructions.*

Test Point	Voltage
Table 1	
X1	+5.00V $\pm$ 0.15V
X4	+24.00V $\pm$ 5.00V
X5	+19.00V $\pm$ 4.00V
X6	-19.00V $\pm$ 4.00V
X7	+5.00V $\pm$ 0.25V
X8	GND Reference
X9	-12.00V $\pm$ 0.25V
X10	+12.00V $\pm$ 0.25V
Table 2	
X2	GND Reference
X3	+8.5V $\pm$ 2.00V
Table 3	
TP9	GND Reference
TP10	+2.000V $\pm$ .003V
TP12	-12.00V $\pm$ 0.25V
TP13	-5.00V $\pm$ 0.25V
TP14	+5.00 $\pm$ 0.25V
TP15	+15.00V $\pm$ 1.00V

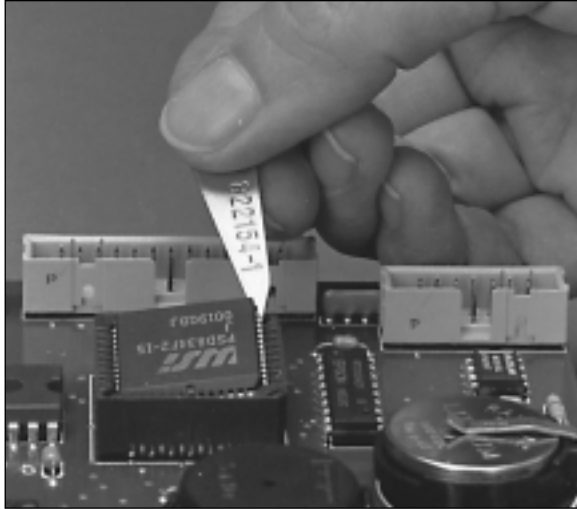## Display Assembly Verification

For blank display, or faulty keypad operation, proceed as follows:

1 Remove the power cord from the AC power cord socket.

2 Remove the rear housing. *See Rear Housing Removal in the **Repair** section for instructions.*

3 Disconnect and reinstall the display cable to the CPU P4 connector. *See Display Assembly Removal / Installation in the **Repair** section for instructions.*

4 Reinstall the power cord. If the display now functions, remove the power cord, install the rear housing, reinstall the power cord, and resume normal operation. *See Rear Housing Installation in the **Repair** section for instructions.* If the display or keypad remain faulty, proceed with step 5.

5 Remove the power cord from the AC power cord socket. Connect a good "test" display assembly to the CPU assembly. Reinstall the power cord.

If the "test" display functions properly, the original display is defective. Replace with a new display assembly.

If the "test" display does not function, the CPU is defective. Install a new CPU assembly.

*See CPU Assembly Removal / Installation in the **Repair** section for instructions.*

Flash Device Verification

If the Flash Device is not completely inserted into position U3 on the CPU, the Rapidchem display assembly will remain blank on power up, and the analyzer will appear "off". Inspect the insertion. Verify that it is properly installed by pressing on the device with your thumb.

If it is necessary to inspect the Flash Device itself, remove the Flash Device with the removal tool by prying each corner of the Flash Device until it can be removed by hand. Inspect the Flash Device's metal connectors. They should appear curled and separated from each other. If any of the connectors appear bent, gently straighten them. If the Flash Device is permanently damaged, contact your Rapidchem dealer.
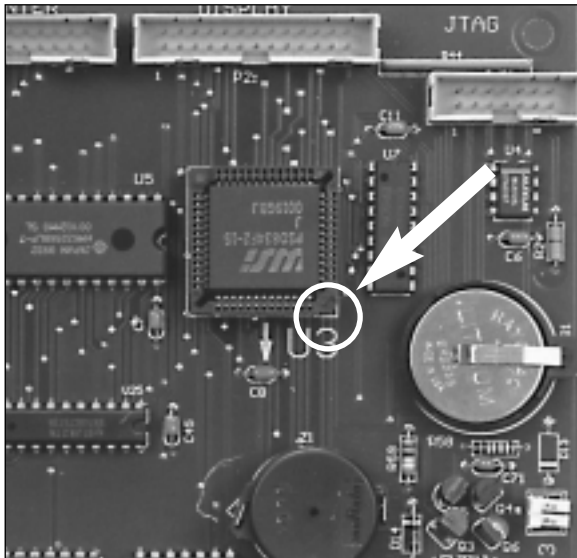
Reinstall the Flash Device into the U3 position with the chamfered edge in the lower right corner. Incorrect Flash Device orientation may damage the Flash Device and/or socket.

Printer Verification

If the printer is not actively printing:

▲ Verify that the printer paper is correctly installed.

1 Proceed to the **SETUP MENU?**. **USER OPTIONS?** is displayed. Press NO. Press YES to **CONFIGURATION?** and **PRINTER STATUS?**. Confirm that the printer is ON by pressing YES or NO to the displayed message. Confirm that the paper is threaded properly.

2 Press 9 on the keypad. The printer head should move across the paper. If the printer head moves, resume normal operation. If the printer head does not move, proceed to Step 3.

3 Remove the power cord from the AC power cord socket, wait 10 seconds, then reinstall the power cord. If the printer is still not functioning, remove the power cord and the rear housing, then remove the printer assembly. Inspect for paper jams or obstructions in the printer head area. *See Rear Housing Removal and Printer Assembly Removal in the **Repair** section for instructions.*

4 Reinstall the printer assembly. *See Printer Assembly Installation in the **Repair** section for instructions.* Confirm that the printer cable is completely inserted into the P3 connector on the CPU. Reinstall the power cord. If the printer fails to print, install a known working "test" printer assembly in the analyzer.
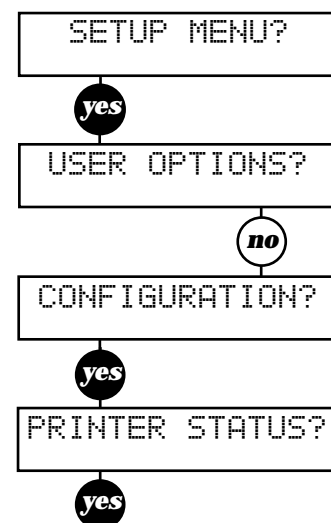
If the test printer assembly works, install a new printer assembly in the analyzer.

If the test printer assembly fails, the CPU is defective. Install a new CPU assembly. *See CPU Assembly Removal / Installation in the **Repair** section for instructions.*
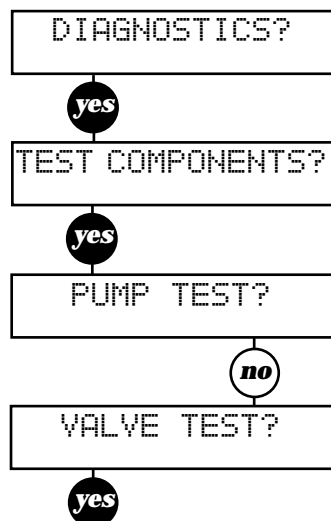
```
┌──────────────────┐
│   SETUP MENU?    │
└──────────────────┘
        │ (yes)
┌──────────────────┐
│  USER OPTIONS?   │
└──────────────────┘
        │ (no)
┌──────────────────┐
│  CONFIGURATION?  │
└──────────────────┘
        │ (yes)
┌──────────────────┐
│  PRINTER STATUS? │
└──────────────────┘
        │ (yes)
```

Pump Verification

```
┌─────────────────────────┐
│     DIAGNOSTICS?         │
└─────────────────────────┘
          (yes)
┌─────────────────────────┐
│   TEST COMPONENTS?       │
└─────────────────────────┘
          (yes)
┌─────────────────────────┐
│     PUMP TEST?           │
└─────────────────────────┘
          (yes)
```
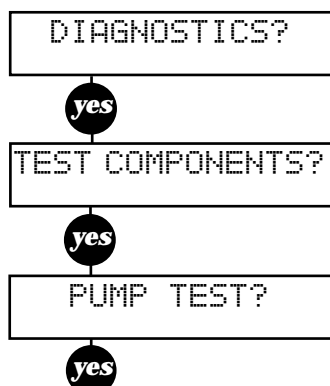
For suspected pump problems, proceed to **PUMP TEST?**. under **TEST COMPONENTS?** in the **DIAGNOSTICS?** section of the **SECOND MENU**. Press YES. The screen displays **ROTATING...**. Look for pump rotation. If full pump rotation occurs, **FULL ROTATION?** is displayed. Press YES and **PASS** is displayed.

When there is no pump movement or partial pump movement, press NO and **FAIL** is displayed. Remove the pump tubing and repeat the **PUMP TEST?**. If the test passes, install a new pump tubing and resume operation. If the test fails, install a new pump assembly. *See Pump Assembly Removal / Installation in the* **Repair** *section for instructions.*

Valve Verification

```
┌─────────────────────────┐
│     DIAGNOSTICS?         │
└─────────────────────────┘
          (yes)
┌─────────────────────────┐
│   TEST COMPONENTS?       │
└─────────────────────────┘
          (yes)
┌─────────────────────────┐
│     PUMP TEST?           │
└─────────────────────────┘
               (no)
┌─────────────────────────┐
│     VALVE TEST?          │
└─────────────────────────┘
          (yes)
```

For suspected valve problems, proceed to the **VALVE TEST?** under **TEST COMPONENTS?** in the **DIAGNOSTICS?** section of the **SECOND MENU?** Press YES. The screen displays **ROTATING...**, then **FULL ROTATION?**. Look for rotation of the valve knob and press YES or NO. When full valve knob rotation occurs, press YES and **TESTING...** is displayed. Internal testing verifies correct valve positioning for the Cal A, Cal B, Rinse, Air and Home positions. **PASS** or **FAIL** is displayed.

When there is no valve knob movement or partial valve knob movement, press NO and **FAIL** is displayed. Repeat the **VALVE TEST?** If the test fails again, install a new valve module. *See* **Rapidchem Operator's Manual** *for valve module replacement instructions.*

Sensor Signal Input Verification

Rapidchem sensors that report out of range voltages may be defective and require replacement. Sensor troubleshooting is discussed in the Rapidchem Operator's Manual. If the Rapidchem analyzer reports repeated sensor voltage errors, follow this procedure.

1 Remove the Rapidchem sensors from the sensor module and check for any fluid leakage around the sensors and their pins. Examine the contact housing connectors for any corrosion. All of these surfaces must be completely dry and salt free. Reinstall the sensors and attempt recalibration. If the voltage problems continue, it is likely that a defect exists in the amplifier section of the CPU assembly, or the contact housing is defective.

2 Remove the rear housing. *See Rear Housing Removal in the* **Repair** *section for instructions.*

3 Install a new pre-amp PC board. *See Pre-amp PC Board/Contact Housing Removal / Installation in the* **Repair** *section for instructions.*
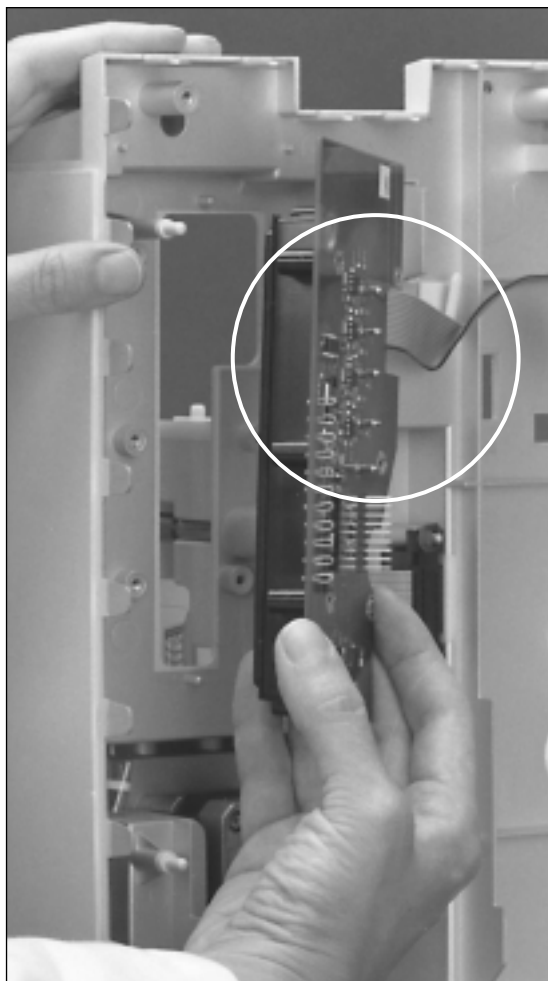
Serial Communication Verification

1 Using a Rapidchem serial cable, connect the analyzer to a device with a known working serial port.

2 Refer to the serial interface specifications on this page.

3 When correctly linked, the data that is on the external device should match the data on the printout.

▲ See Rapidchem Operator's Manual for Computer Connection setup.

▲ The data is always sent to the port on the rear of the analyzer at a baud rate of 2400 bps. The bit configuration is 8 data bits, 1 stop bit, no parity. If the data is not being transmitted, the CPU board will need to be replaced.

Serial Interface Specifications

Connector	25 or 9 pin or a D-sub male or both
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
Transmission Rate	2400 bits per second
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	

Repair Overview

To replace Rapidchem assemblies, disassemble the analyzer in the order described in this section, referring to the photographs for assistance. After rear housing removal, the printer assembly and display assembly can be removed without removing the CPU. Access to all other assemblies requires removing the CPU board.

Before performing major repairs, proceed to **PRINT SETUP?** under **STORED INFORMATION?** in the **SECOND MENU?** and print the following settings:

USER OPTIONS?,
CONFIGURATION?,
PATIENT LIMITS?,
PATIENT INFORMATION?

▲ Quality control data and patient results will be lost if the CPU board is changed.

```
                    ┌──────────────┐
                    │   STORED     │
                    │ INFORMATION? │
   ┌──────────┐     └──────────────┘
   │ PATIENT  │────( yes )
   │ RESULTS? │     ┌──────────────┐
   └──────────┘     │ QC RESULTS?  │
        ( no )──────└──────────────┘
                         ( no )──────┐
                              ┌──────────────┐
                              │ CALIBRATION  │
                              │    DATA?     │
                              └──────────────┘
                                   ( no )
                              ┌──────────────┐
                              │REAGENT MODULE│
                              │   STATUS?    │
                              └──────────────┘
                                   ( no )
                              ┌──────────────┐
                              │ PRINT SETUP? │
                              └──────────────┘
                                  ( yes )
```
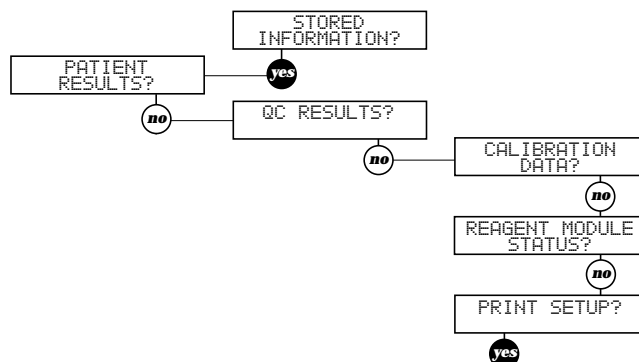
Required Tools

Only 4 tools are required to remove or install the Rapidchem electronic and mechanical assemblies:

- Phillips screwdriver, #2 magnetic

- Phillips screwdriver, #1

- Needle nose pliers

- Flash Device Removal Tool (provided with software replacements and updates)
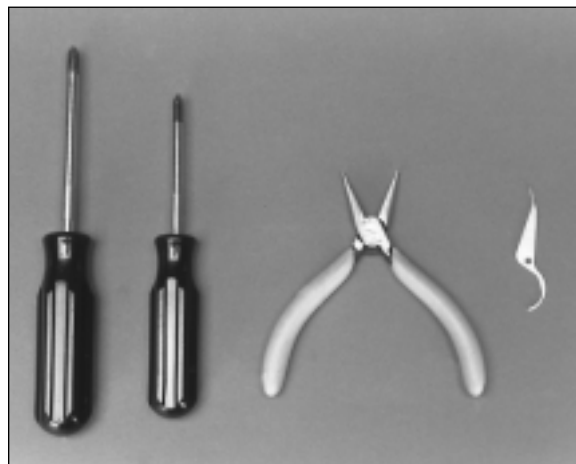
Rear Housing Removal

Cut the printer paper to separate it from the analyzer and remove paper. Remove the 5 screws from the rear housing.

Pull back the rear housing.
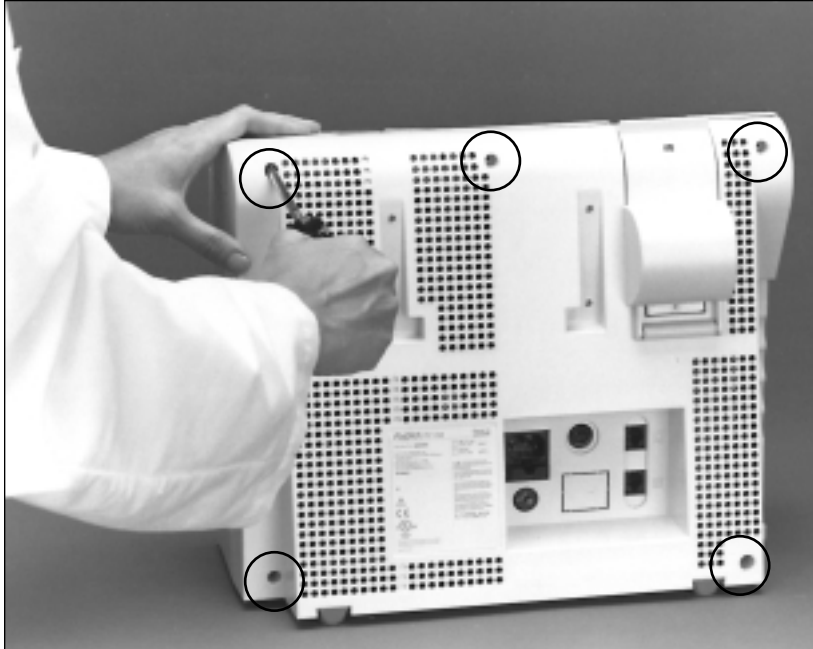
Rear Housing Installation

Align the rear housing with the front housing. Verify that all cables are enclosed inside the housings. Insert and tighten the 5 screws into the rear housing. Do not over tighten.
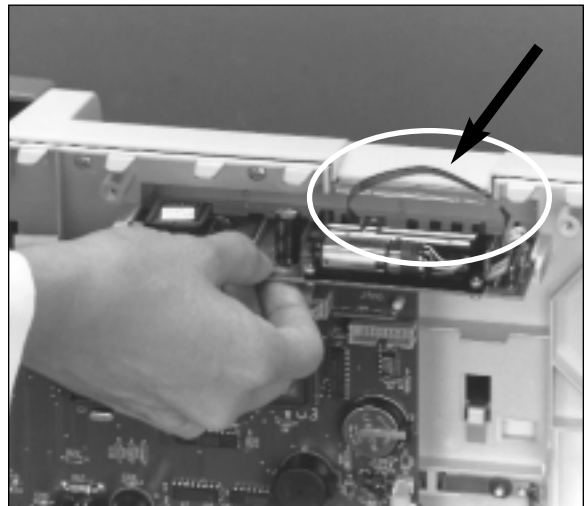
Reinstall the printer paper.
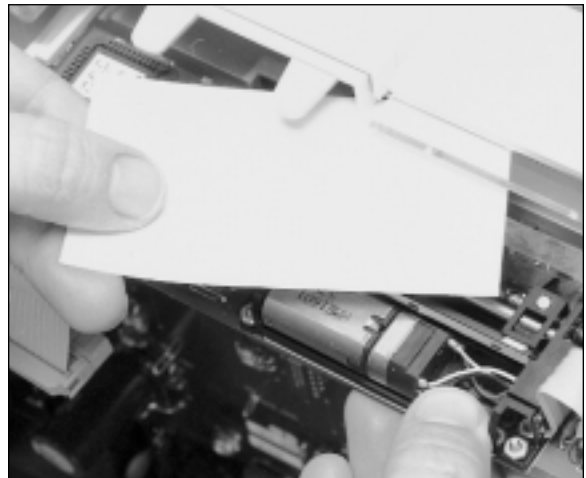
Printer Assembly Removal

Disconnect the P1 connector from the CPU assembly.
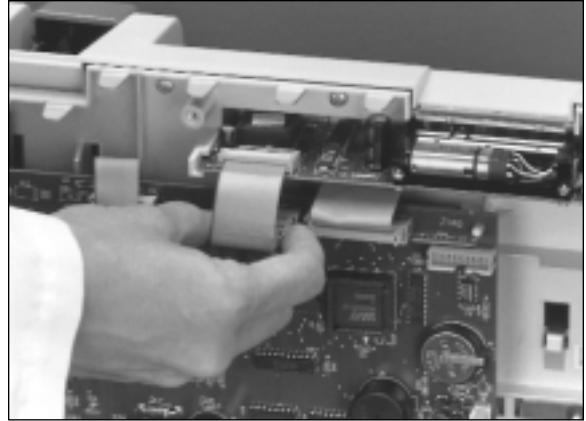
Slide the printer assembly out of the housing tracks. Avoid pinching the flex cable under the housing.

Printer Assembly Installation

Slide the printer assembly into the front housing cavity, using a thin, flat object (e.g., business card) to guide the printer flex cable under the housing. Avoid pinching the cable.

Insert the printer cable into the P1 connector on the CPU as shown above.

Display Assembly Removal

The reagent module, sensor module, valve module, and printer assembly must be removed before removing the display assembly.

Disconnect the P2 connector from the CPU assembly.
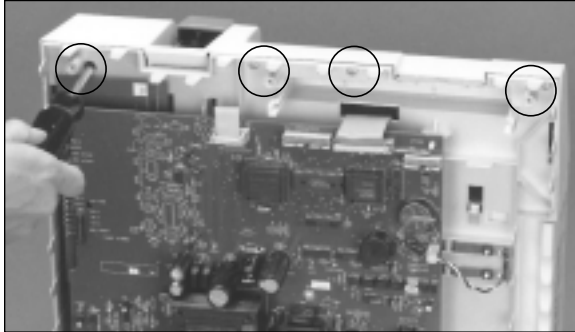
Remove the 4 screws that run along the top of the rear surface of the front housing.
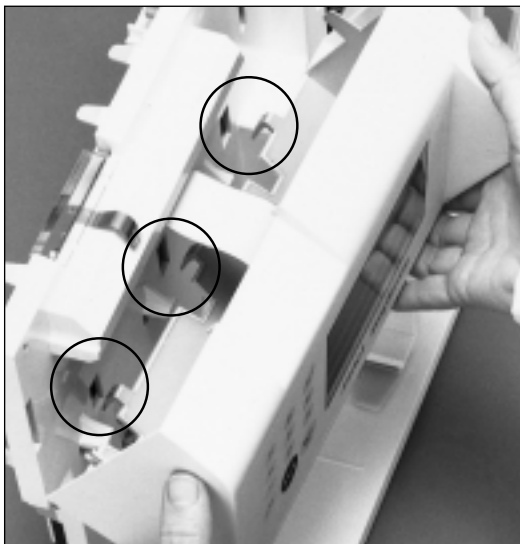
After screw removal, grasp the display assembly as shown and gently lift up and away from the front housing, guiding the ribbon cable through the opening in the front housing.
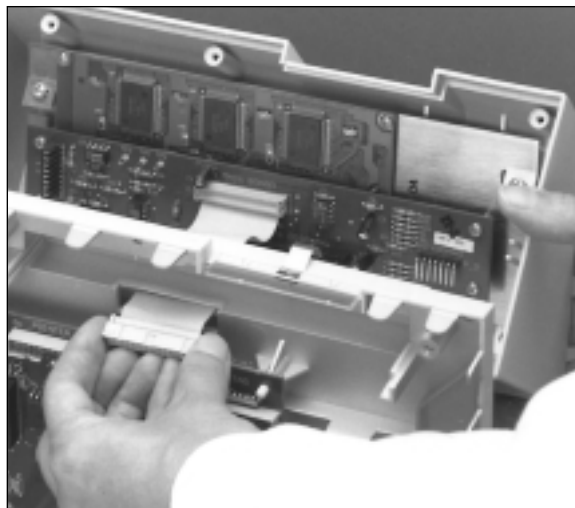
Display Assembly Installation

Insert the display cable through the rectangular window in the front housing.

Align the display assembly insertion hooks with the openings in the front housing. Push the assembly against the front housing until it locks. Enclose the top access door post under the upper right corner of the display housing.

Reinstall 4 screws along the top surface of the front housing. Attach the display cable to the P2 connector on the CPU assembly.

CPU Assembly Removal

★ Before replacing the CPU assembly, you must have a new CPU assembly and a Flash Prom Replacement Kit. It is necessary to go through the steps listed in the next section, "Flash Device Removal." Prior to removing the old CPU board, install the new CPU board with the new Flash Prom and follow the steps listed in the next section, "Flash Prom Installation."

Remove the printer assembly before removing CPU assembly. Disconnect cables at CPU positions P1, P2, P5, P7, P6 and P13.

Remove the screw in the center of the CPU (P15), while supporting the transformer. Carefully slide the CPU assembly off the 4 corner mounting posts and the pre-amp PC board.
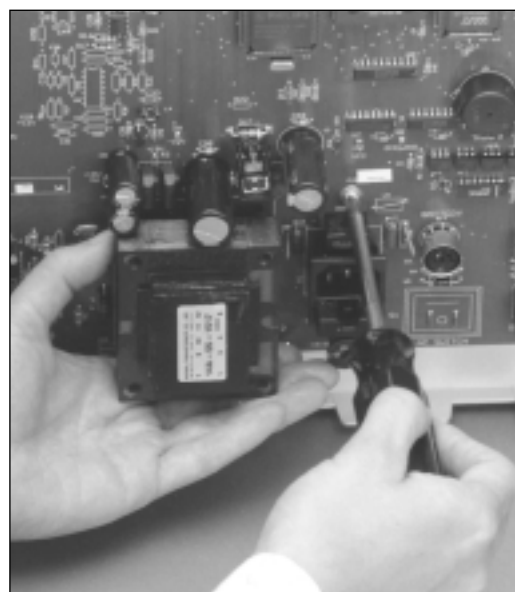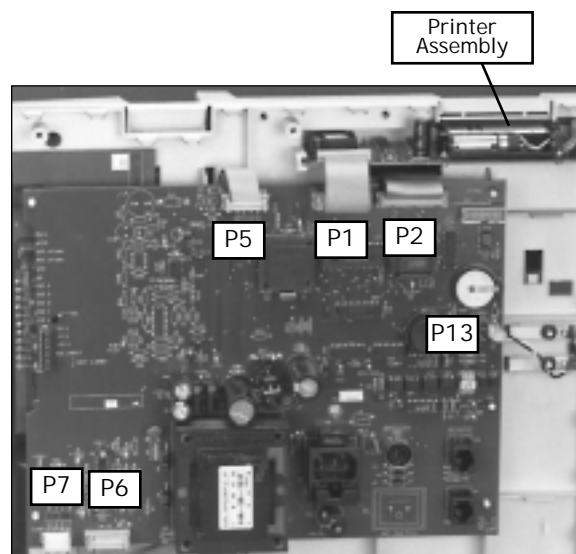
CPU Assembly Installation

Carefully line up the four corner mounting holes on the CPU assembly with the mounting posts on the front housing. Gently push in the CPU assembly, making the connection between the pre-amp PC board and CPU assembly.

Secure CPU assembly to front housing with mounting screw at P15.
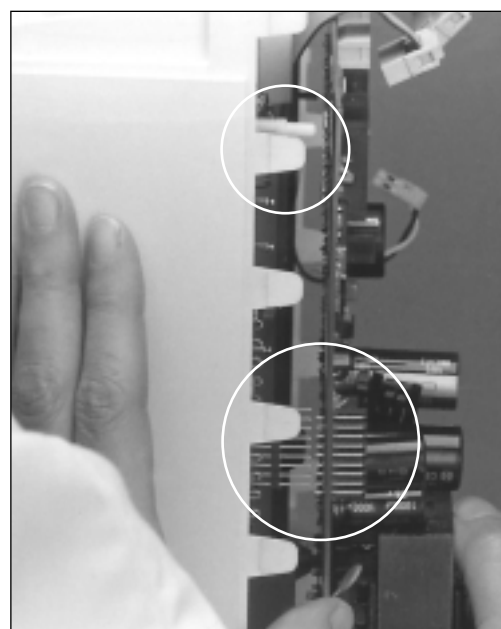
Flash Device Removal

★ Before changing the flash device on the Rapidchem, follow these steps:

(Faliure to follow these steps will result in analyzer malfunction.)

STANDBY?	Press yes
STANDBY IN 1 MIN.	Press yes, yes, yes, 9, yes, yes
SERVICE MENU?	Press yes
PROG. DOWNLOAD?	Press no
LOADER DOWNLOAD?	Press no
REPLACE PRE-AMP?	Press no
REPLACE FLASH?	Press yes
PLEASE CONFIRM!	Press yes
POWER DOWN NOW	Disconnect power
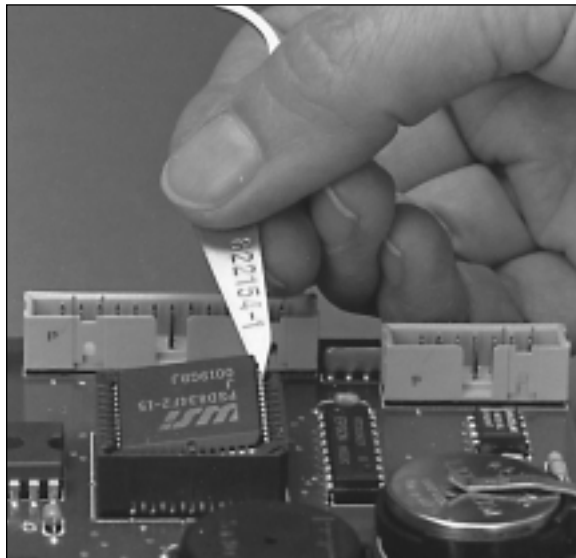
Remove the flash device with the removal tool by prying each corner of the flash device until it can be removed by hand.

Flash Device Installation

Install the flash device into the U3 position with the chamfered edge in the lower right corner. Incorrect flash device orientation may damage the flash device and/or socket.

★ After changing the flash device on the Rapidchem, power up and follow these steps:

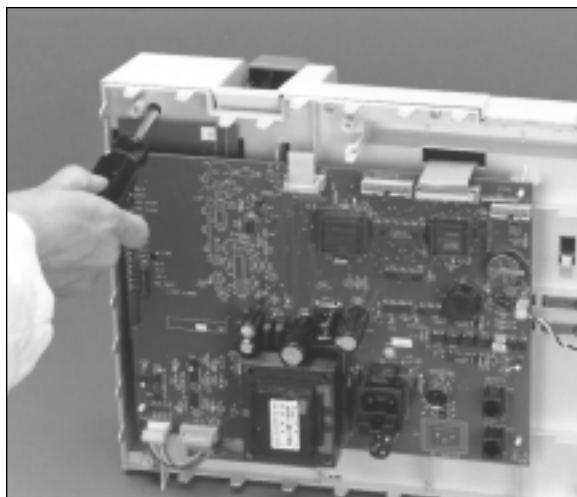|	
STANDBY?	Press yes
STANDBY IN 1 MIN.	Press yes, yes, yes, yes, yes
QC MENU?	Press yes
UNIT SETTINGS?	Press no
CLEAR MEMORY?	Press yes
PLEASE CONFIRM!	Press yes

Access Door Removal

Remove the CPU assembly and loosen the top left screw on the rear of the analyzer.

Lift the right corner of the display assembly to disengage the access door post. Lift the door to remove the bottom post.

Access Door Installation

Insert the bottom door post into the front housing base. Lift the right corner of the display assembly and insert the access door post. Tighten the screw on the rear of the front housing.

▲ In order to properly transfer data stored from the existing pre-amp PCB to a new pre-amp PCB, it is necessary to follow the steps listed in the chart below. (Failure to follow these steps will result in a "MISMATCH ERROR" on the printout.)

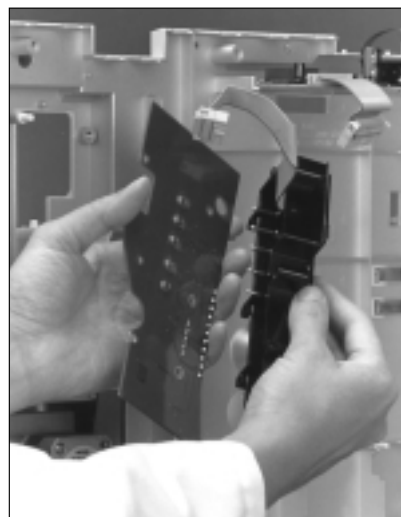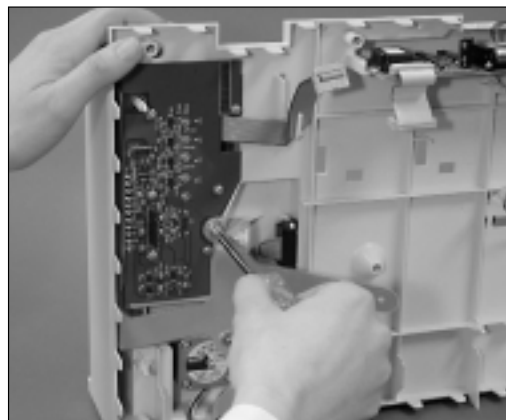★ Before changing the Pre-amp PC board on the Rapidchem, follow these steps:

|	
STANDBY?	Press yes
STANDBY IN 1 MIN.	Press yes, yes, yes, 9, yes, yes
SERVICE MENU?	Press yes
PROG. DOWNLOAD?	Press no
LOADER DOWNLOAD?	Press no
REPLACE PRE-AMP?	Press yes
PLEASE CONFIRM!	Press yes
POWER DOWN NOW	Disconnect power

Pre-amp PC Board/Contact Housing Removal

Remove the screw which connects the grounding strap to the pre-amp PC board.

Remove the 6 screws from the pre-amp PC board.

Remove the pre-amp PC board with the contact housing attached from the front housing. The contact housing can be removed from the pre-amp PC board by gripping both sides and pulling apart.
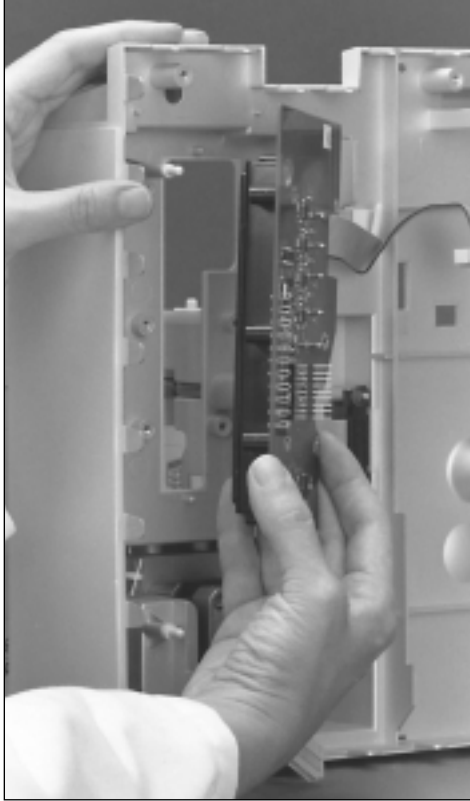
Pre-amp PC Board/Contact Housing Installation

Align the opening on the pre-amp PC board with the CPU board mounting post. This will align the screw holes. Insert the 6 screws to secure. Do not overtighten. Connect the grounding strap to the pre-amp PC board.

★ After changing the Pre-amp PC board on the Rapidchem power up and follow these steps:

|	
STANDBY?	Press yes
STANDBY IN 1 MIN.	Press yes, yes, yes, yes, yes
QC MENU?	Press yes
UNIT SETTINGS?	Press no
CLEAR MEMORY?	Press yes
PLEASE CONFIRM!	Press yes

Valve Cable Removal

Remove the retaining clips securing the valve cable with needle nose pliers.

Caution: DO NOT damage the posts.

By squeezing the retaining clips with the pliers, the clips should lift off the posts.

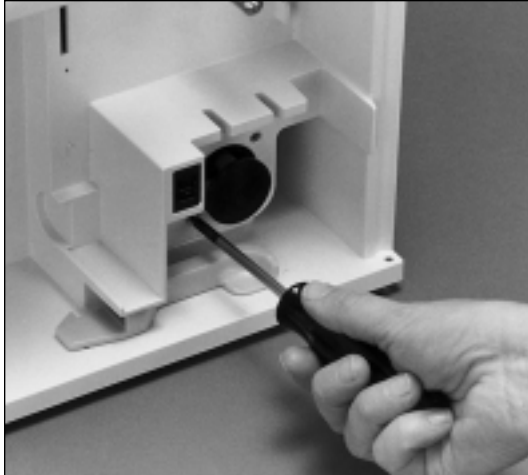Remove the valve cable from the front housing.
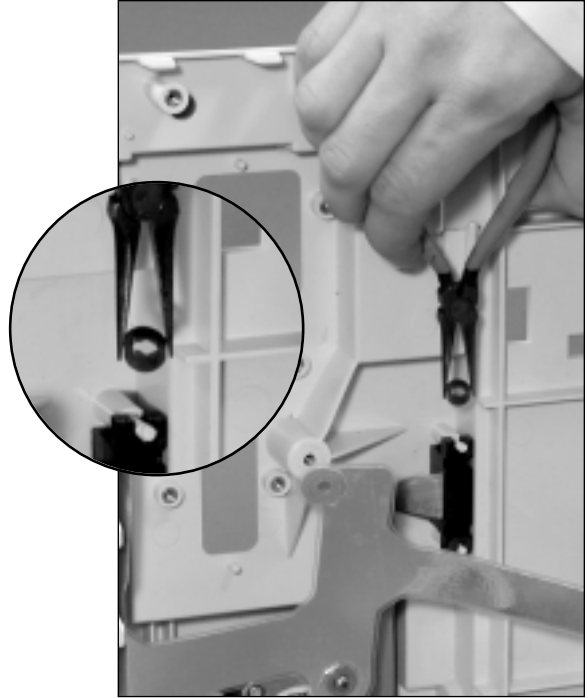
Valve Cable Installation

Insert the valve cable into the back side of the front housing so that the ribbon cable is positioned on the left side of the connector.

Install 2 new retaining clips (top and bottom) on the cable posts to secure the connector. Push clips on using needle nose pliers.
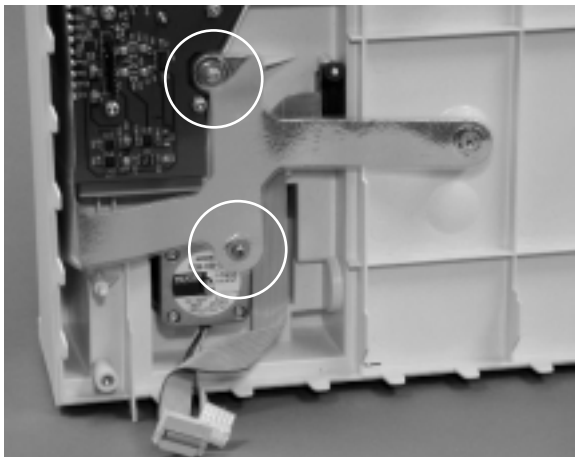
Pump Assembly Removal

Remove the CPU assembly before removing the pump assembly. Using a #1 Phillips, remove the 2 screws and washers from the front side of the front housing.

Remove the screws which connect the grounding strap to the pre-amp PC board and the pump assembly. Place the grounding strap aside. Slide the pump assembly through the back side of the front housing.

Pump Assembly Installation

Insert the pump through the backside of the front housing. Align the pump bracket holes with the 2 mounting posts on the front housing so that the pump motor cable is positioned below the pump assembly.

While holding the pump assembly in position, insert the 2 screws with washers through the front side of the front housing to secure the pump in position.

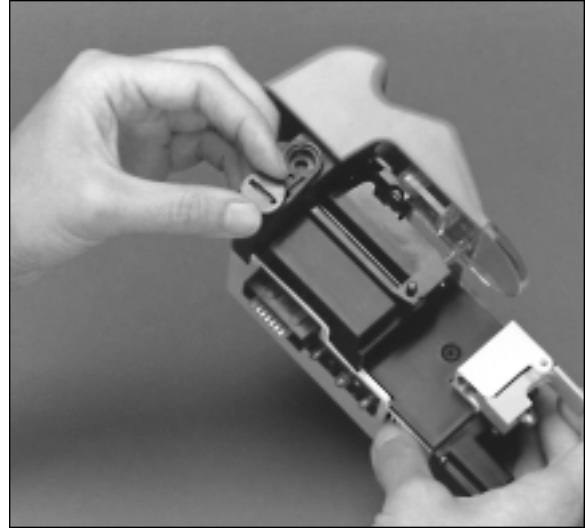Attach the grounding strap to the pump assembly and the pre-amp PC board.

Sampler Removal ⚠️

If the sampler requires replacement, it can be removed from the sensor module. Using a coin or fingers, remove the retaining screw from the sensor module.

▲ Also refer to package insert for sampler removal and installation updates.

Remove the screw mount (includes spring).

Rotate the sampler into the capillary position, then pull it out of the sensor module.
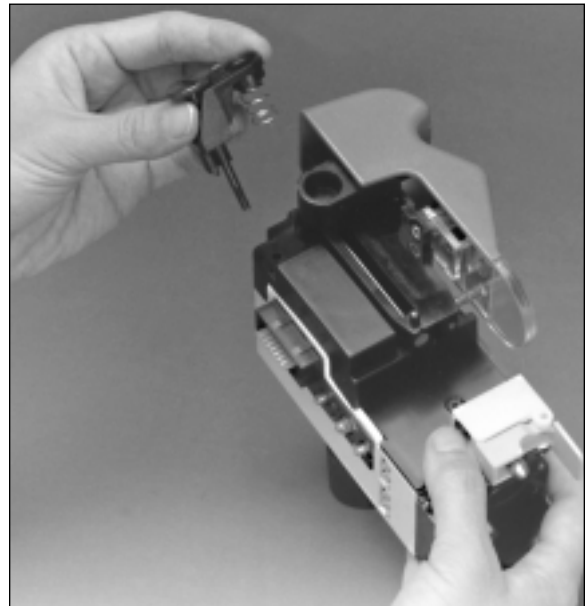
Sampler Installation

Install the new sampler (includes sample probe and wiper) in the sensor module. Insert the sampler alignment pin into the sensor module. Rotate the sampler into the closed position.

Install the screw mount (includes spring) into the sampler. Replace the retaining screw and tighten.

▲ Do not overtighten the retaining screw.
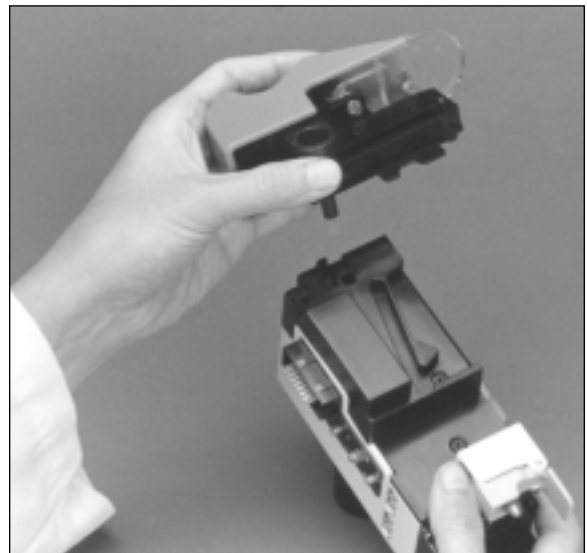
Software Upgrade Kit

This kit includes a 3.5″ Floppy Disk and a serial cable.

Analyzer Setup

Using the serial cable, connect to the PC serial port. Connect the RJ11 plug/connector to the barcode port on the rear panel of the Rapidchem.

Store files provided by Bayer (*.hex and *.key) in a convenient directory. The name of the hex file is the CRC number used to validate the successful update of the program.

PC Setup

Open Hyper Terminal under Programs > Accessories > Communications.

Enter a new connection name and click OK. Select Direct to Com port connected and click OK.

Change to 4800 bits per second, 8 Data Bits, Parity NONE, Stop Bit 1, and Flow Control Xon/Xoff.

Click at Advanced, uncheck Use FIFO Buffer, and press OK twice.

Click at File, then select Properties to confirm all settings that selections above are correct.

Select File, then Save As, and enter a new file name.

Load New User Program

Open Hyper Terminal with your new hyper terminal file.

Turn analyzer on. Select STANDBY? under SECOND MENU?

When the STANDBY IN 1 MIN. message is blinking, press yes three times, press 9 once, then press yes twice.

SERVICE MENU? is displayed. Press yes.

Press yes to PROG. DOWNLOAD? and yes to CONFIRM!

When the message POWER DOWN/UP appears, turn the analyzer off, then turn back on after 3 seconds.

The analyzer will display LOAD NEW PROGRAM - CONFIRM? Press yes. SEND <X.KEY> NOW is displayed. The analyzer is ready to receive data.

▲ At this time, you have approximately one minute to begin the download. If a timeout occurs, the analyzer returns to the **LOAD NEW PROGRAM** message. By answering no to this and yes to **GO BACK TO OLD PROGRAM**, the user can discontinue the download process.

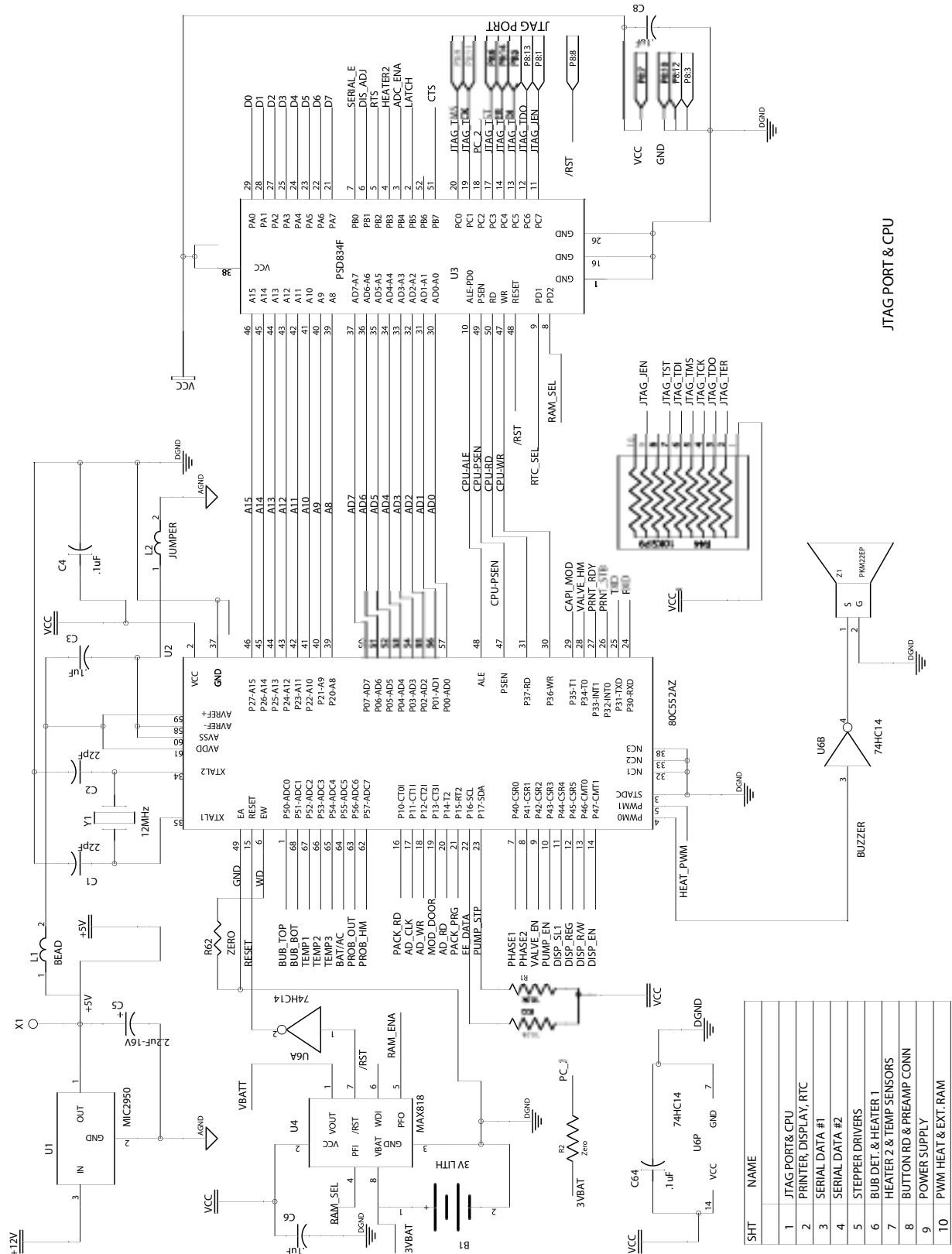Select Send Text file under transfer menu from the tool bar in Hyper Terminal windows.

Browse to the director which stores *.key and .hex files. Select the .key file, then click at **OPEN**. The analyzer displays Erasing Flash... and then displays **SEND <.HEX> FILE**. Go to Send Text file again. Select Total.hex file, then click at **OPEN**. The analyzer should display a **RECEIVING FILE...** message. This process will take approximately 7-12 minutes.

▲ Responses are required during file transfers.

When **DOWNLOAD FINISH** is displayed, press yes. The display should show **CRC CORRECT?** Confirm the number printed is the same as the name of the hex file and answer yes. If the numbers do not agree, answer no. Restart program and repeat the download steps. If numbers still do not match, contact your Bayer representative.

When all steps are complete, the analyzer will reset itself. Upon restarting, the analyzer is running with new revision software.

JTAG PORT & CPU

SHT	NAME
1	JTAG PORT & CPU
2	PRINTER, DISPLAY, RTC
3	SERIAL DATA #1
4	SERIAL DATA #2
5	STEPPER DRIVERS
6	BUB DET. & HEATER 1
7	HEATER 2 & TEMP SENSORS
8	BUTTON RD & PREAMP CONN
9	POWER SUPPLY
10	PWM HEAT & EXT. RAM

PRINTER, DISPLAY PORT & RTC

B

SERIAL DATA PORT #1

C

SERIAL DATA PORT #2

C17
.1uF

DGND

RXD

VCC

U18

1A 1Y   4
1B
2A 2Y   7
2B
3A 3Y   9
3B
4A 4Y   12
4B
VCC
GND   8   DGND
A\B
G

74HC157

RXD1
RXD2

LATCH

NC — P4:1

P4:5

P4:2

NC — P4:4

NC — P4:3

P4:6

X2

X3

C16
10uF-16V

REMOTE-GND

R5
10K

REMOTE-GND

R7
2.21K

D2
1N4148

REMOTE-GND

ISO_V+

U16
PS2505

U17
PS2505

VCC

/RTS

R4
2.21K

DGND

R6
2.21K

DGND

U6D
74HC14

RTS

74HC14
U6E

RXD2

D

STEPPER MOTOR DRIVERS

VALVE

PUMP

E

BUBBLE DETECTOR & HEATER #1

F

HEATER 2 & TEMP SENSORS

TEMP3

+5V

U9A
TLC2274A
R37
9.09K

C35
.1uF

AGND

R36
1K

R35
49.9K

U27
LM35
OUT
GND
IN

L3
BEAD

DGND

C34
.001uF

R34
499

VCC

U9PB
TLC2274A
VANA+
GND
C36
.1uF

AGND

TEMP2

U9D
TLC2274A

R33
36.5K

R32
6.34K

+5V

HEATER2

Q2
F15N05L

DGND

R29
52.3K

+5V

R30
100K

C33
.1uF

R31
6.34K

AGND

DGND

+24V

W2
RXE075

P6:14
P6:12
P6:1
P6:2

VALVE_HM

P6:11
P6:13

VCC

U6F
74HC14

R28
4.99K

D11
5.6V znr

DGND

VALVE

G

+12V

1N4148
D14

P13:1
P13:2

DGND

Q3
TL082L

D13
SA11AC

C71
4700pF

R57
10K

Q4
2N7000

Q5
2N7000

R58
10K

Q6
2N7000

VCC

R59
4.99K

PACK_RD

PACK_PRG

BUTTON READER & PREAMP CONNECTOR

P9:9
P9:7
P9:3
P9:2
P9:1
P9:5
P9:6
P9:4
P9:8

-18V
+18V
AD_WR
AD_RD
AD_CLK
ADC_ENA
EE_DATA
GND

AGND

AGND

DGND

POWER SUPPLY

PWM HEATING & EXT. RAM

C46
.1uf
DGND

VBATT

U28
HM62256B

28 VCC
GND 14
DGND

R/W 27 CPU-WR
CE 20 RAM_ENA
OE 22 CPU-RD

A14 1
A13 26
A12 2
A11 23
A10 21
A9 24
A8 25

A7 3
A6 4
A5 5
A4 6
A3 7
A2 8
A1 9
A0 10

I/O8 19
I/O7 18
I/O6 17
I/O5 16
I/O4 15
I/O3 13
I/O2 12
I/O1 11

A14
A13
A12
A11
A10
A9
A8
A7
A6
A5
A4
A3
A2
A1
A0

VCC

C47
.1uf
DGND

U26
74HCT573

20 VCC

1Q
2Q
3Q
4Q
5Q
6Q
7Q
8Q

1D
2D
3D
4D
5D
6D
7D
8D

GND 10 DGND
C
OC 11

AD7
AD6
AD5
AD4
AD3
AD2
AD1
AD0

CPU-ALE

+24V

U21
LM2575ADJ

1 VIN
4 VOUT
ON 5
FB
GND 3
2
DGND

C38
1uf

C43 .1uf
VANA- 4 -12V
OPA2131P
U22PA
C44 .1uf
VANA+ 8
+12V

D12
1N5820

L6
100uh

R39 43.2K
R38 2.00K

C10
330uf 35V
DGND

C37
1uf

HEATPWM

U22A
OPA2131P

1
2
3

R40 10.0k
U22B
OPA2131P
7
6
5
DGND

Q1
LM285-1.2

R41
R42

HEATCON

R43 15.8k
-12V
-1.25V

J

Contacting Bayer Diagnostics

For technical assistance, contact your local authorized representative. For customer service or additional information, contact your local authorized distributor.

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