invitrogen™

iPrep™ Purification Instrument

For automated purification of nucleic acids using magnetic beads

Catalog no. IS-10000

Version B
12 January 2007
25-0927

User Manual

Table of Contents

iPrep™ Experienced Users Procedure

Introduction

This quick reference protocol is included for experienced users of the iPrep™ Instrument. If you are using the iPrep™ Instrument for the first time, refer to the detailed protocol in this manual.

Step	Procedure
Installation	1. Place the iPrep™ Purification Instrument on a level laboratory bench such that the **power** switch and the AC inlet on the rear of the unit (page xiii) are easily accessible. 2. Ensure the AC power switch is in the **OFF** position (page xiii). 3. Attach the power cord to the AC inlet and then to the electrical outlet. Use only properly grounded AC outlets and power cords.
Insert the iPrep™ Card	1. Ensure the power switch is on the **OFF** position. 2. Open the iPrep™ Card Slot. 3. Insert the iPrep™ Protocol Card in the slot in the correct orientation (arrow on the card is at the top and card label is facing your left side). Close the iPrep™ Card Slot. 4. Using the Power Switch located on the left side of the instrument, turn **ON** the instrument. If the card is fully inserted in the correct orientation, the display shows the Main screen and all axes return to their original positions automatically.
Purification Protocol	From the Main screen, you can run a protocol, setup the date/time (page 17), or perform instrument tests (page 34). For sample preparation, see the iPrep™ Kit manual. 1. Press **Start** to run a protocol. Select the desired purification protocol. 2. Open the iPrep™ door. Remove the iPrep™ Cartridge Rack and iPrep™ Tip and Tube Rack to set up the platform. 3. Remove the iPrep™ Cartridges from the box. To collect any solution from the foil, tap the cartridge to deposit the solution at the bottom of the tube. 4. Load the desired number of cartridges on the iPrep™ Cartridge Rack. Slide the cartridge in the direction of the arrow along the groove on the rack until the cartridge reaches the end of the groove. Push down the cartridge under the overhang part of the rack. Insert the loaded iPrep™ rack on the iPrep™ Platform. 5. Load the iPrep™ Tip and Tube Rack as follows: • Load the first row (labeled as **E**) with 1-13 elution tubes **without caps** • Keep the second row (labeled as **T1**) is empty • Load the third row (labeled as **T2**) with iPrep™ Tips in the iPrep™ Tip Holders • Load the fourth row (labeled as **S**) with sample tubes **without caps** containing the sample. 6. If you wish to record the barcodes, read the sample and elution tube barcodes using the barcode reader included with the instrument as described on page 27. 7. Place the iPrep™ Tip and Tube Rack on the iPrep™ Platform. 8. Press **1** to continue. Close the iPrep™ Door. 9. Select the appropriate elution volume on the display. 10. Press **Start** to begin the automated purification protocol. Various steps of the protocol including the approximate time remaining are displayed on the digital display.

Continued on next page

iPrep™ Experienced Users Procedure, Continued

Step	Procedure
Purification Protocol, continued	*Protocol continued from previous page* 11. At the end of the run, the instrument beeps briefly and the digital display shows **Protocol Finished** for 10 seconds. The Main menu appears after 10 seconds. 12. Open the instrument door. 13. Remove and cap the elution tubes containing the purified nucleic acid. Store the purified DNA as described in the iPrep™ Kit manual. 14. Discard the used cartridges, tips, and tubes into biohazard waste. Do not reuse the cartridges. 15. To purify more samples using the same iPrep™ Card, load the racks with new cartridges, tips, tubes, and samples, and start the protocol as described above. 16. If you are not using the instrument, close the instrument door and turn the power switch to **OFF**.
Remove the iPrep™ Card	1. Open the iPrep™ Card Slot. 2. Push the button located below the card slot to eject the card from the slot. 3. Pull out the card from the slot and place the card in the box. Store the card protected from light.

Product Contents

iPrep™ Purification Instrument

The contents of the iPrep™ Purification Instrument are listed below:

Component	Quantity
iPrep™ Purification Instrument	1
Specific Power Cord based on the type of unit ordered (for U.S./Canada/Taiwan/Japan, Europe, or UK)	1
iPrep™ Cartridge Rack	1
iPrep™ Tip and Tube Rack	1
Bottom Tray	1
Barcode reader box (see below for contents)	1
iPrep™ Starter Set (see below for contents)	1 set
Silicon Grease	1
D-rings	13
Fuse (6.3 A and 3.15 A)	1 each
Instruction Manual	1

See page 5 for specifications and description of the iPrep™ Purification Instrument, and page 15 to install the instrument.

Upon Receiving the Instrument

Examine the unit carefully for any damage incurred during transit. Any damage claims must be filed with the carrier. The warranty does not cover in-transit damage.

iPrep™ Starter Set

The iPrep™ Starter Set includes plastic disposables set (see below for contents) that is used for test runs or training purposes.

Note: The Reaction Cartridges with the Starter Set are supplied empty. Do not fill the Reaction Cartridges with any buffers or solutions during use as a Starter Set with the instrument. Sample or elution tubes are not supplied with the Starter Set.

Product	Quantity
iPrep™ Tips	52
iPrep™ Tip Holders	52
Reaction Cartridges	13

Barcode Reader Box

The Barcode Reader Box includes a barcode reader, a CD-ROM containing the CommViewer Barcode software for installation, and a RS232C serial cable.

Safety Information

Safety

Follow the instructions in this section to ensure safe operation of the iPrep™ Purification Instrument. The iPrep™ Purification Instrument is designed to meet EN61010-1 Safety Standards. To ensure safe, reliable operation, always operate the iPrep™ Purification Instrument according to the instructions in this manual. Failure to comply with the instructions in this manual may create a potential safety hazard, and will void the manufacturer's warranty and void the EN61010-1 safety standard certification. Invitrogen is not responsible for any injury or damage caused by use of this instrument when operated for purposes which it is not intended. All repairs and service should be performed by Invitrogen.

In an emergency, immediately turn the Power Switch Off and unplug the instrument.

Informational Symbols

The symbols used on the iPrep™ Purification Instrument and in the manual are explained below:

High Temperature Caution

Used near the heat block to indicate a warning resulting due to high temperature.

Biohazard

Used near the area of the tip waste to indicate that the area may be contaminated with biohazard materials. Do not touch this area without laboratory gloves.

Used to indicate that water or chemicals should not come into contact with any part of the instrument. Water or chemicals may cause damage and void the warranty.

Hazard

Touching the left side of the instrument with wet hands may result in an electric shock.

Do not touch the surface of the heat block. The temperature of the heat block may be very high (up to 95ºC) and can cause burns.

Unplug the instrument, if not used for extended periods of time.

When using the instrument, follow standard procedures for quality control and method development.

Used near the pistons to indicate a crush warning resulting from placing the hand under the piercing unit which may cause injury.

Product Specifications

iPrep™ Purification Instrument Specifications

Environmental Conditions	
Input Power: is necessary	AC 100-240 V, 240 VA, 50/60 HzGrounding
Installation site:	Indoor use only
Altitude:	Up to 2,000 meters
Operating Temperature:	5-40°C
Maximum Relative Humidity:	80% for temperatures up to 31ºC decreasing linearly to 50% relative humidity at 40ºC
Transient Category:	Installation categories II
Pollution Degree:	2
Specifications	
Instrument Type:	Benchtop dispenser instrument with 13 nozzles
Sample Processing:	1 to 13 samples/batch
Processing Time:	Variable (see purification kit manual for details)
Dispensing Volume:	5-1000 µl
Dispensing Accuracy:	Blue Tips 5-20 µl: Less than 15% (CV%) 21-200 µl: Less than 2% (CV%) DN100N Tips 25-50 µl: Less than 5% (CV%) 50-1000 µl: Less than 2% (CV%)
Heat Block Temperature Control*:	30ºC to 80ºC (assuming a room temperature of ~25ºC)
Software:	iPrep™ Card
Instrument Dimensions:	20 inches (w) x 22 inches (d) x 22.5 inches (h)
Weight:	121 pounds (55 kg)
Built-in Features:	Digital display, alarm, light LED

The iPrep™ Purification Instrument including the Bottom Tray, Cartridge Rack, Tip and Tube Rack is compatible with the iPrep™ reagents and standard nonhazardous laboratory reagents.

*The listed temperature is for the heating block and may not reflect the actual temperature of the sample/solution in a tube.

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Product Specifications, Continued

The CE mark symbolizes that the product conforms to all applicable European Community provisions for which this marking is required. Operation of the iPrep™ Purification Instrument is subject to the conditions described in this manual.

The protection provided by the instrument may be impaired if the instrument is used in a manner not specified by Invitrogen.

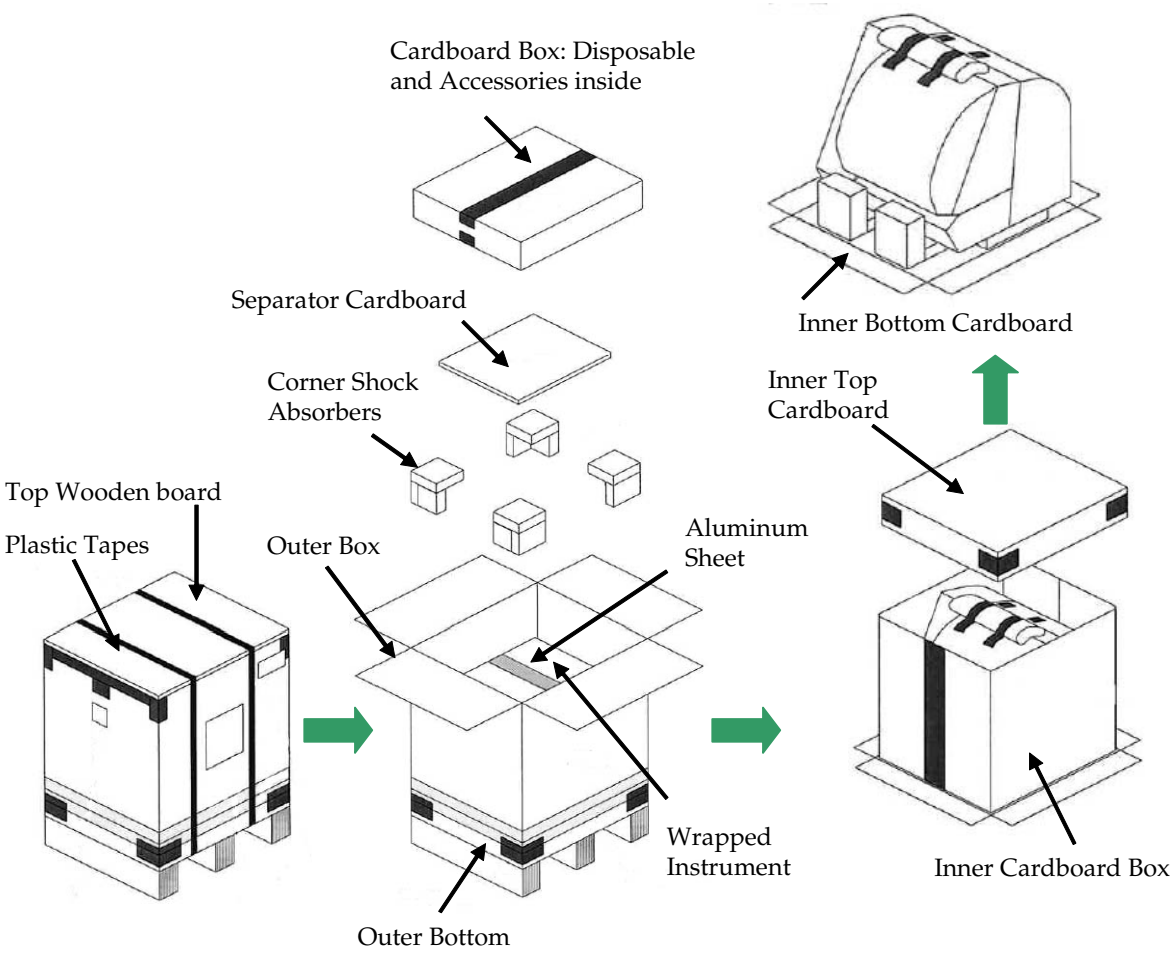
The UL mark indicates certification by Underwriters Laboratories, Inc and certification by Underwriters Laboratories for Canada—a testing facility recognized by the Standards Council of Canada (SCC)

Unpacking the iPrep™ Purification Instrument

Unpacking Instructions

Follow the instructions below to unpack the iPrep™ Purification Instrument. The weight of the instrument is 113 pounds (51 kg).

1. Cut plastic tapes and remove and outer top cardboard.
2. Remove the packages containing the plastic disposables and instrument accessories. Remove the cardboard tray.
3. Pull out the shock absorbers from the four corners and remove the outer cardboard box by pulling up on the box.
4. Remove the wrapped instrument box from the outer bottom cardboard. Remove the aluminum sheet wrapping the instrument box.
5. Remove the instrument from the inner cardboard box. The instrument is now in a plastic wrap without any cover. Handle the instrument carefully from this point to avoid any damage to the unit.
6. Remove the plastic sheet. Proceed to the next page to remove the protectors from the instrument.



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Removing Protectors

Follow the instructions below to remove the protectors added to the instrument to prevent any damage to the instrument components during transportation.

1. Remove the adhesive tapes near the door (see figure below) and the iPrep™ Card Slot.

2. Open the iPrep™ Door as described on page 6 to remove the platform stopper by removing the 3 screws using a small Philips head screwdriver.

3. To remove the Styrofoam protector under the Syringe unit inside the iPrep™ Platform, turn **ON** the iPrep™ Instrument after installation as described on page 15. Once the instrument is turned **ON**, the Syringe unit automatically moves up to release the styrofoam protector. **Do not** attempt to manually remove the styrofoam protector under the Syringe unit.
4. See page 15 for instructions to install the instrument.

iPrep™ Purification Instrument

Front View of iPrep™ Instrument

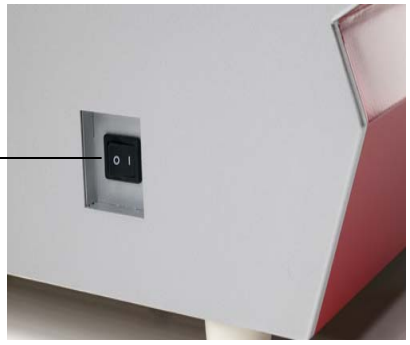
The front view showing various parts of the iPrep™ Purification Instrument is shown below.

Rear and Side View of iPrep™ Instrument

The rear and side view showing various parts of the iPrep™ Purification Instrument are shown below.

Rear View

Side View



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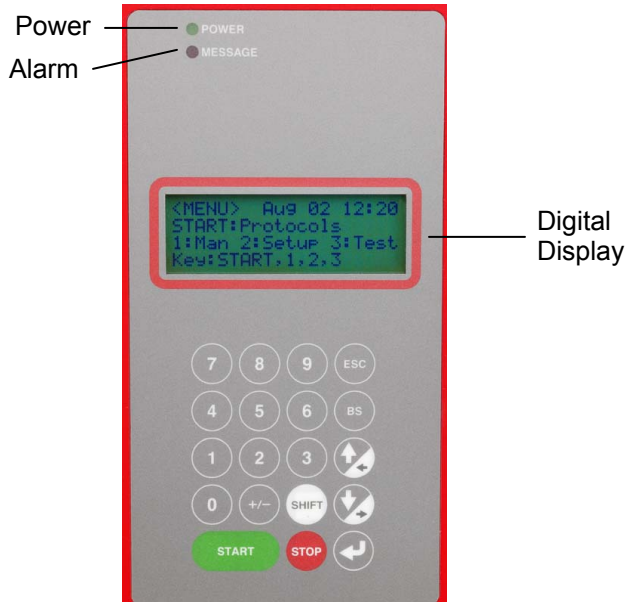
User Interface of iPrep™ Instrument

The user interface of the iPrep™ Purification Instrument is used to operate the instrument and perform maintenance/service by a service engineer, and consists of:

- The Digital Display that shows the protocol that is in use and various steps of the protocol (see next page for details).
- Two LEDs; Power LED green indicates the power is ON and Alarm LED to indicate errors (blinking red)
- The Keypad to enter parameters and operate the instrument. The keys described in the table below are for routine use.

Key	Description
0 to 9	To choose menu
ESC	To previous menu
START	To run protocol
STOP	To stop/pause protocol
↵	Return (to confirm or enter the next menu)
BS	Backspace key to delete the last digit/character
Shift	Shift + Up/Down arrow keys allow you to move the cursor right or left during time/date setup



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iPrep™ Purification Instrument, Continued

Digital Display

The digital display consists of 4 lines with 20 columns of each line.

For the Main menu, Test menu, and Manual menu:

- The first line shows the current level
- The second and third line show the executable commands on this level
- The fourth line describes the keys to use for executing the commands

For the protocols screen, the display provides current information on the protocol step and allows you to choose some options.

Accessory Products

iPrep™ Spare Parts

The following iPrep™ Spare Parts are available separately from Invitrogen.

For more information, visit www.invitrogen.com or contact Technical Support (page 45).

Product	Quantity	Catalog no.
iPrep™ Tip and Tube Rack	1	IS-10101
iPrep™ Cartridge Rack	1	IS-10102

iPrep™ Kits and Cards

The following iPrep™ Cards and iPrep™ Kits for use with the iPrep™ Instrument are available separately from Invitrogen.

For more information, visit www.invitrogen.com or contact Technical Support (page 45).

Product	Quantity	Catalog no.
iPrep™ Forensic Card (includes buccal protocol)	1 card	IS-10011
iPrep™ gDNA Blood and Tissue Card	1 card	IS-10010
iPrep™ GeneCatcher™ gDNA Blood Kit	1 kit (52 purifications)	IS-10001
iPrep™ ChargeSwitch® Forensic Kit	1 kit (52 purifications)	IS-10002
iPrep™ ChargeSwitch® Buccal Cell Kit	1 kit (52 purifications)	IS-10003
iPrep™ ChargeSwitch® gDNA Tissue Kit	1 kit (52 purifications)	IS-10004

Introduction

Overview

Introduction

The iPrep™ Purification System consists of the iPrep™ Purification Instrument, iPrep™ Protocol Cards, and iPrep™ Kits that allow automated, fast, and reliable nucleic acid purification from various samples within 20-30 minutes (depending on the type of iPrep™ Kit used).

The iPrep™ Purification Instrument is based on the patented Magtration® (magnetic filtration) technology from PSS (Precision System Science) which traps magnetic beads against the sidewall of the pipetting tip. This improves the washing of beads and DNA recovery compared to other magnetic based purification systems that trap magnetic beads on the bottom of the reaction well.

The iPrep™ Purification System eliminates filtration and centrifugation from nucleic acid purification. The purified DNA is suitable for use in various downstream applications including PCR, STR (short-tandem repeat analysis), and restriction enzyme digestion.

See page 5 for details on various parts of the system.

System Components

The iPrep™ Purification system consists of:

- iPrep™ Purification Instrument

  The iPrep™ Purification Instrument allows automated purification of nucleic acids from up to 13 samples (12 samples + 1 positive control) at a time using magnetic bead based technology. The instrument is a simple, user friendly unit with small footprint and is controlled by the iPrep™ Protocol Card. See page 5 for details.

- iPrep™ Kits

  The iPrep™ Kits contain the sample preparation reagents as well as reagents (buffers for the purification protocol and magnetic beads) and plastic disposables for nucleic acid purification from a variety of samples using magnetic bead based technology. See the manual supplied with each kit for details.

- iPrep™ Protocol Card

  To use each iPrep™ Kit with the iPrep™ Instrument, you need to purchase a protocol specific iPrep™ Protocol Card from Invitrogen. Each iPrep™ Protocol Card is pre-programmed with the purification protocol that directs the volume of reagents used and incubation time.

Continued on next page

System Overview

The iPrep™ Purification System performs magnetic bead based nucleic acid purification using ChargeSwitch® or GeneCatcher™ Technology developed by Invitrogen. See pages 3-4 for details on each technology.

To use the iPrep™ Purification System for nucleic acid purification, you will:

1. Prepare the sample lysate, if needed, using the sample preparation reagents included with the iPrep™ Kits.
2. Insert the appropriate iPrep™ Protocol Card into the card slot on the iPrep™ Instrument to start the purification protocol.
3. Assemble the reaction cartridges containing the purification reagents, and the iPrep™ Tips and Tubes on the racks. Place the assembled racks on the iPrep™ Platform.
4. Select the purification parameters from the display to start the automated purification protocol.

The iPrep™ Purification Instrument utilizes a simple bind–wash-elute procedure (page 12) to purify high-quality DNA avoiding the use of centrifuges or vacuum manifolds.

During the automated purification protocol, the sample lysate is mixed with magnetic beads for subsequent DNA binding to magnetic beads in tips. The DNA-bound magnetic beads are separated from the lysate using magnetic separation on the tips. The beads are thoroughly washed with Wash Buffers to remove contaminants. The purified DNA is then eluted in Elution Buffer.

Continued on next page

Features

Important features of the iPrep™ Purification System are listed below:

- User-friendly iPrep™ Instrument design with an integrated heat block and magnetic unit for fast, automated nucleic acid purification within 20-30 minutes
- Ability to perform simultaneous purification from up to 12 samples and 1 positive control
- Minimal cross contamination between samples due to less handling
- Pre-programmed iPrep™ Protocol Card contains the purification protocol allowing hands-free purification
- Provides consistent, reliable results due to the simultaneous rapid and accurate dispensing of reagents by 13 nozzles in the Syringe Unit
- Very low carry-over of magnetic beads into the purified DNA
- Built-in safety features in the instrument enhance user safety

The ChargeSwitch® Technology

The ChargeSwitch® Technology (CST®) is a novel magnetic bead-based technology that provides a switchable surface charge dependent on the pH of the surrounding buffer to facilitate nucleic acid purification. In low pH conditions, the CST® beads have a positive charge that binds the negatively charged nucleic acid backbone (see figure below). Proteins and other contaminants are not bound and are simply washed away in an aqueous wash buffer. To elute nucleic acids, the charge on the surface of the bead is neutralized by raising the pH to 8.5 using a low salt elution buffer (see figure below). Purified nucleic acid elutes instantly into this elution buffer, and is ready for use in downstream applications.

Continued on next page

The GeneCatcher™ Technology

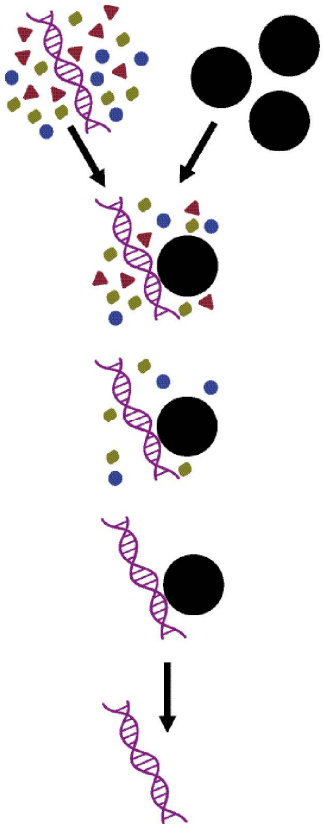
The GeneCatcher™ Technology is a novel magnetic bead-based technology that is designed to work on a wide range of blood samples including archived or poorly stored blood samples to facilitate genomic DNA purification.

See figure below for details.

Step 1–DNA Capture–Cells are lysed and crude DNA is captured on magnetic beads leaving most of the cell debris and protein behind in solution.

Step 2–DNA Purification–Any residual protein is digested using the protease and then washed away to leave pure intact DNA.

Step 3–Elution–The pure DNA is then eluted into a small volume ready for use in any downstream applications.



Purpose of the Manual

This manual provides the following information:

- Details and specifications on the iPrep™ Purification Instrument and iPrep™ Kits
- Unpacking and installing the iPrep™ Purification Instrument
- Operating the iPrep™ Instrument
- Cleaning and maintaining the iPrep™ Instrument
- Troubleshooting

Specific purification protocols are included in the manuals supplied with iPrep™ Kits.

Description of Parts

Introduction

The various parts of the iPrep™ Purification Instrument and iPrep™ plastic disposables are described below.

iPrep™ Purification Instrument

The iPrep™ Purification Instrument is a benchtop, automated nucleic acid purification instrument with integrated Magnetic and Syringe unit capable of purifying nucleic acids from up to 12 samples and 1 positive control. Each iPrep™ Instrument consists of the Magnetic and Syringe Unit, and a platform. A pre-programmed iPrep™ Protocol Card controls the purification parameters such as buffer volumes, mixing steps, and incubation time. The iPrep™ Instrument is designed to run for 8-10 hours continuously without any cooling period required between runs.

See page xiii for a front and rear view of the device.

The front view of an open iPrep™ Purification Instrument identifying various parts is shown below.

Syringe Unit

The Syringe Unit contains 13 nozzles that simultaneously move in the Z-axis direction to aspirate and dispense the reagents that allow nucleic acid purification.

Magnetic Unit

The Magnetic Unit contains 13 magnets (neodymium iron boron type) that align with the iPrep™ Tips to simultaneously separate the magnetic beads from up to 13 samples during nucleic acid purification.

Piercing Unit

The Piercing Unit contains 13 piercing rods that move in Z-axis to pierce the foil on the cartridges before the purification protocol begins.

Heating Unit

The Heating Unit allows rapid heating of samples to up to 95ºC. Based on the purification protocol, place a sample tube in the first well of the Heating Unit if heating is required.

Continued on next page

Description of Parts, Continued

iPrep™ Purification Instrument, continued

Platform

The platform on the iPrep™ Instrument allows the placement of two racks, iPrep™ Cartridge Rack and iPrep™ Tip and Tube Rack, that are filled with plastic disposables and contain the reagents, tips, and tubes required for the purification protocol.

iPrep™ Cartridge Rack

The iPrep™ Cartridge Rack allows easy placement of specially designed, disposable cartridges that is pre-filled with buffers and magnetic beads required for the purification protocol. See page 8 for details.

iPrep™ Tip and Tube Rack

The iPrep™ Tip and Tube Rack allows easy placement of iPrep™ Tips, Sample tubes with samples and Elution tubes to collect the eluate. See page 8 for details.

User Interface

The User Interface is located on the front of the instrument and contains the digital display, light LED, and keypad. See page xiv for User Interface details.

iPrep™ Door

The iPrep™ Door is a transparent door that allows you to visualize the purification protocol as well as prevent any sample contamination.

To operate the iPrep™ Door, push up the door until the door is held by the magnet to open the door (see figure A). To close the door, lower the door until the door touches the magnet (see figure B) Avoid clamping your hands or fingers under the door.

Opening iPrep™ Door (fig. A)

Closing iPrep™ Door (fig. B)

Continued on next page

iPrep™ Protocol Card

The iPrep™ Protocol Card is a flash, 512 KB memory card. Each iPrep™ Protocol Card is pre-programmed with the purification protocol that directs the volume of reagents used, mixing steps, and incubation time.

The following iPrep™ Protocol Cards are available from Invitrogen (page xvi):

- iPrep™ Forensic Card for use with iPrep™ Charge Switch® Forensic kit and iPrep™ ChargeSwitch® gDNA Buccal Kit
- iPrep™ Blood and Tissue Card for use with iPrep™ GeneCatcher™ gDNA Blood Kit and iPrep™ ChargeSwitch® gDNA Tissue Kit

Always store the iPrep™ Protocol Card in the box, protected from light.

To avoid damaging the card:

- Do not drop or bend the card
- Do not wipe or clean the card using volatile chemicals such as alcohol or equivalent
- Do not expose the card to water or any solution

Note: If you accidentally damaged the iPrep™ Protocol Card, you can purchase additional card from Invitrogen ((page xvi).

Bottom Tray

The Bottom Tray is a stainless steel tray that is placed below the plastic disposables to avoid exposing the instrument to biohazardous sample or any damage to the instrument. Each iPrep™ Instrument includes a removable bottom tray. The tray dimensions are 16.8 inches (l) x 10.8 inches (w) x 0.25 inches (d).

To clean the tray, move the platform backward manually. Holding the front edge of the tray, remove the tray from the instrument. Clean the tray using mild detergent, rinse with deionized water, and dry the tray before use. Place the tray back properly in the bottom of instrument before use.

Continued on next page

Description of Parts, Continued

iPrep™ Cartridge Rack

The iPrep™ Cartridge Rack is a stainless steel, aluminum alloy rack that holds the pre-filled cartridges during purification. The rack is designed to fit on the platform in only one orientation (indicated with an arrow). The rack dimensions are 10.8 inches (l) x 5.5 inches (w) x 2.3 inches (d).

The rack assembled with cartridges is placed in the platform. See page 25 for assembling the rack.

Each iPrep™ Instrument includes 1 iPrep™ Cartridge Rack. See page 37 for cleaning and maintenance of parts.

Important: The iPrep™ Cartridge Rack is designed to hold iPrep™ Reagent Cartridges only. Do not load reagent cartridges from other manufacturer's on the iPrep™ Cartridge Rack.

iPrep™ Tip and Tube Rack

The iPrep™ Tip and Tube Rack is a stainless steel rack designed to hold sample tubes, tips in tip holders, and elution tubes. The rack dimensions are 11.3 inches (l) x 4 inches (w) x 3 inches (d). The position for the placement of tips and tubes are marked on the rack as follows:

- Row 1 is marked as **E** for placing elution tubes
- Rows 2 and 3 are marked as **T1** and **T2**, respectively, for placing tips
- Row 4 is marked as **S** for placing sample tubes containing the sample

The caps of the elution tubes can be placed on specially designed space on the rack (see figure below) to quickly cap the elution tubes to prevent any contamination.

The rack is assembled with the tips and tubes as described on page 26 and then placed on the platform. See page 37 for cleaning and maintenance of parts.

Each iPrep™ instrument includes 1 iPrep™ Tip and Tube Rack.

Continued on next page

Description of Parts, Continued

Barcode Reader

A hand held barcode reader is included with the iPrep™ Instrument. The Barcode reader allows you to read the barcode on sample and elution tubes to allow you to track samples.

The barcode reader is designed to read most standard barcodes including EAN, Code 39, and Code 128. On reading the barcode, the reader provides a positive reading feedback which includes an audible beep and a green spot on the barcode.

Each iPrep™ instrument includes 1 barcode reader, 1 CD-ROM with CommViewer Barcode Software, and 1 RS232C serial cable.

Barcode Specifications

Maximum Scan Rate:	270 scans/sec
Maximum Resolution:	0.076 mm
Reading Indicators:	Beep and a green spot on the code
Sensor:	CCD Solid state (3648 pixels)
Illuminator:	LED array
Wavelength:	630-670 nm
Reading Angle:	Skew: ±80º, Pitch: 65º, Tilt: ±35º
Operating Temperature:	0 to 55ºC
Weight:	~200 g

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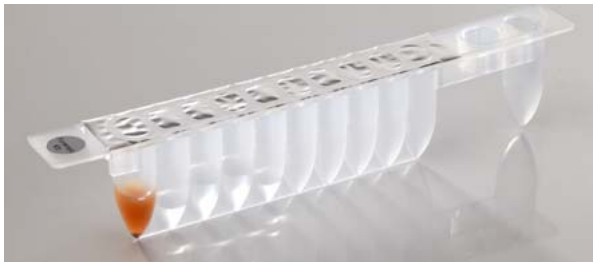
Description of Parts, Continued

iPrep™ Reaction Cartridge

The iPrep™ Reaction Cartridges are supplied with the iPrep™ Kits and are designed to fit onto the iPrep™ Cartridge Rack in only one orientation. Each cartridge is pre-filled with specific reagents required for the protocol. Each cartridge has 12 positions with 10 sealed wells and two heating positions (position 12 with an empty well and position 11 to add a reagent filled or empty tube). Positions 1-10 contain wells filled with reagents or some may be empty depending on the protocol.

Cartridge Specifications:

Material:	Polypropylene cartridge sealed with laminated aluminum foil
Max Volume:	1000 µl/well
Dimension:	5.9 inches (l) x 1.2 inches (w) x 0.7 inches (d)



iPrep™ Tips and Holders

The iPrep™ Tips and Tip Holders are included with the iPrep™ Kits and are placed on the iPrep™ Tip and Tube Rack as described on page 26. While assembling the tips on the rack, insert the iPrep™ Tips into the iPrep™ Tip Holders using gloved hands. Always use the tips with the holders to prevent any contamination.

Tip Specifications:

Tip Material:	Polypropylene with filter barriers
Tip Holder Material:	Polypropylene
Tip Volume:	5-1000 µl
Tip Dimension:	3.9 inches (l) x 0.43 inches (d)

iPrep™ Tip Holder

iPrep™ Tip

Continued on next page

Description of Parts, Continued

iPrep™ Tubes

Two sets of iPrep™ Tubes are required for the purification protocol. The iPrep™ sample and elution tubes are included with each iPrep™ Kit and placed in their respective positions on the iPrep™ Tip and Tube Rack as described on page 26.

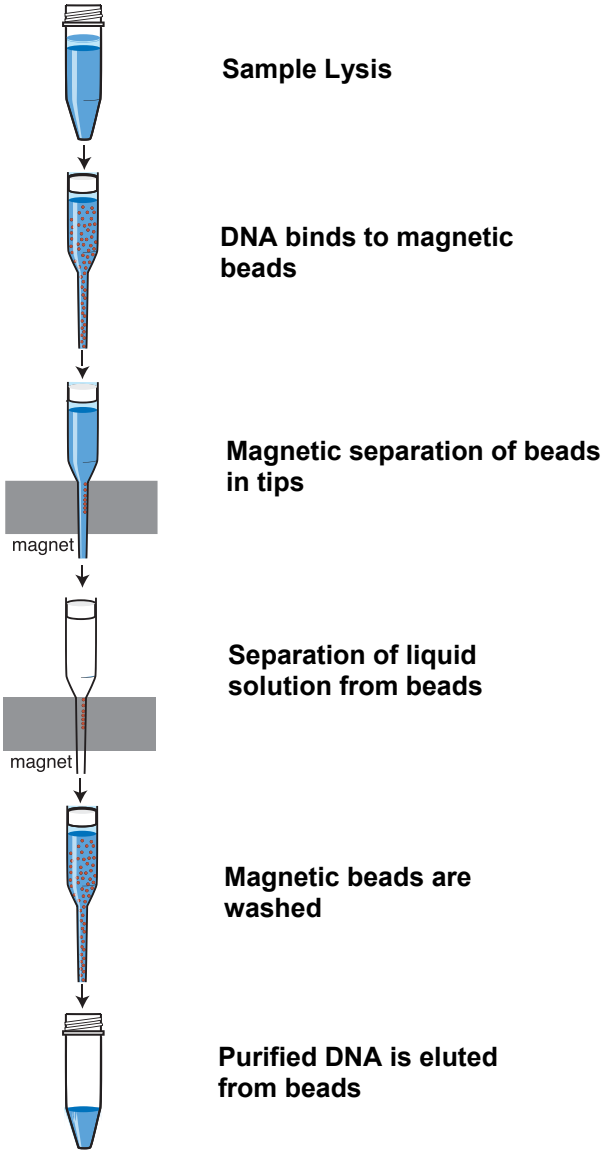
Tube Specifications:

Material:	Polypropylene
Capacity:	1. 5 ml
Style:	Tubes with caps
Dimensions:	1.7 inches (l) x 0.4 inches (d)

Experimental Overview

Experimental Outline

The iPrep™ Purification Instrument performs nucleic acid purification as described below.



Materials Needed

You will need the following items. Ordering information is on page xvi.

- iPrep™ Kits
- iPrep™ Protocol Cards
- Samples
- Barcode labels for sample and/or elution tubes, if you wish to read barcodes

Methods

General Guidelines

Introduction

General guidelines for using the iPrep™ Purification Instrument and iPrep™ Plastic disposables are discussed below.

Recommended iPrep™ Kits

The following iPrep™ Kits available from Invitrogen that are compatible for use with the iPrep™ Purification Instrument. Ordering information for the kits is on page xvi.

Note: Do not use any other kits with the iPrep™ Instrument.

iPrep™ Kit	Sample Type	Purification Protocol Time
iPrep™ ChargeSwitch® gDNA Tissue Kit	Various animal tissues	30 minutes
iPrep™ ChargeSwitch® Forensic Kit	Various forensic samples including dried blood spots, hair follicles and hair shafts, cigarette butts	20 minutes
iPrep™ ChargeSwitch® Buccal Cell Kit	Human buccal cell swabs	18 minutes
iPrep™ GeneCatcher™ gDNA Blood Kit	Human blood samples (fresh, whole blood, EDTA or citrate anti-coagulated blood, frozen blood samples, and old, archived blood samples	26 minutes

Recommended iPrep™ Protocol Cards

To use the iPrep™ Instrument, you need to purchase the iPrep™ Protocol Card separately from Invitrogen. Ordering information is on page xvi. The table below lists the recommended cards for each iPrep™ Kit.

iPrep™ Kit	Recommended iPrep™ Card
iPrep™ ChargeSwitch® gDNA Tissue Kit	iPrep™ gDNA Blood and Tissue Card
iPrep™ ChargeSwitch® Forensic Kit	iPrep™ Forensic Card (includes buccal protocol)
iPrep™ ChargeSwitch® Buccal Cell Kit	iPrep™ Forensic Card (includes buccal protocol)
iPrep™ GeneCatcher™ gDNA Blood Kit	iPrep™ gDNA Blood and Tissue Card

Continued on next page

To obtain the best results, follow these recommendations:

- Wear gloves during the handling of samples or assembling the plastic disposables on the rack.
- Use the appropriate iPrep™ Card with the iPrep™ Kit as described on the previous page.
- Avoid using expired iPrep™ Kit. Always use the iPrep™ Kits before the specified expiration date printed on the package.
- **Be sure to remove the caps of the sample and elution tubes**
- Make sure the sample volume is not less than volume recommended in iPrep™ Kit manuals to ensure proper mixing in the tip and to prevent formation of air bubbles in the tip
- Do not switch the supplied pre-filled reagents with any other buffers as the protocols are specifically optimized with the reagents supplied with the kit.
- Transfer the eluted sample to appropriate storage as described in the iPrep™ Kit manual.

Important

- You can load 1-13 iPrep™ Cartridges on the rack depending on the number of samples that you wish to process. If you are loading less than 13 cartridges, ensure that the remaining plastic ware (tips and tubes) are also loaded in the same order as the cartridges.
- **Do not open the iPrep™ Door once the protocol has started.** The purification protocol stops once the door is opened and you may not be able to continue the protocol. **To pause or stop the protocol, see page 32.**
- Always load the iPrep™ Cartridge Rack first followed by the iPrep™ Tip and Tube Rack as described on page 25. Changing the order of loading the iPrep™ Racks may cause the instrument to stop during a protocol run.
- Do not just place the reagent cartridges on the rack. You need to slide the cartridge into the rack and push down as described on page 25. Incorrect loading of the cartridge may cause the instrument to stop during the protocol run.

Getting Started

Installing the iPrep™ Purification Instrument

1. **Check the Power Cord supplied with the unit to ensure that the cord is compatible with the local socket format.**
2. Place the iPrep™ Purification Instrument on a level laboratory bench. Keep the area around the instrument clear to ensure proper ventilation of the unit.
3. **For your safety:** Position the instrument properly such that the **power** switch and the AC inlet located on the rear of the unit (page xiii) are easily accessible.
4. Ensure the AC power switch is in the **Off** position (page xiii).
5. Attach the power cord to the AC inlet and then to the electrical outlet. Use only properly grounded AC outlets and power cords.

You are ready to use the iPrep™ Instrument for nucleic acid purification. See page 24 for the details.

Important

Do not start the iPrep™ Instrument until the iPrep™ Protocol Card is inserted into the instrument. See next page for details on using the iPrep™ Card.

Using the iPrep™ Device for the First Time

If you are using the iPrep™ Instrument for the first time, you may wish to clean the Bottom Tray, Cartridge Rack, and Tip and Tube Rack with a mild detergent before use (see page 37 for cleaning and maintenance of parts). Allow the parts to dry before starting the protocol. Be sure to place the Bottom Tray back properly in the bottom of instrument before use.

Continued on next page

Inserting the iPrep™ Card

You need to insert the appropriate iPrep™ Protocol Card (available separately from Invitrogen, page xvi) prior to turning on the instrument.

If the card is inserted while the instrument is ON, the card is not recognized by the instrument and digital display does not display the card.

1. Ensure the power switch is on the **OFF** position.
2. Open the iPrep™ Card Slot as shown below.

3. Insert the iPrep™ Protocol Card in the slot in the correct orientation (arrow on the card is at the top and card label is facing your left side) as shown below.

4. **Ensure that card is fully inserted before closing the iPrep™ Slot and turning the instrument ON. Note:** To completely insert the card, you need to manually push the card into the slot.
5. Close the iPrep™ Card Slot.
6. Using the Power Switch located on the left side of the instrument, turn **ON** the instrument. The fan in the instrument starts to run.

   If the card is fully inserted in the correct orientation, the display shows the Main screen shown below and all axes return to their original positions automatically.

   Once in the main menu, you can press **Start** to run the protocol, press **Man** to manually move the axes back to the original positions (page 33), press **Setup** to set date/time (next page), or press **Test** to run instrument tests (page 34).

   Important: Do not remove the iPrep™ Card while the instrument is ON. This will stop the automated purification protocol and may cause corruption of liquid handling files. To remove the card, see page 20.

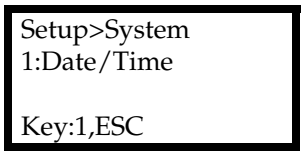
Continued on next page

Using the Setup Screen

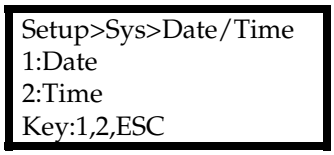
The Setup screen allows you to set the date and time on the display. Various options are displayed on the screen as shown below that allows you to set the date and time. To return to the previous screen, press ESC.

1. Press **Setup** from the Main screen.
2. Press **1** to display **Setup** or press **ESC** to display the Main screen.

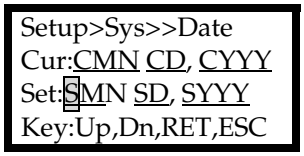
3. Press **System** to display Date/Time.



4. Press **Date/Time** to change date settings (press 1), or time settings (press 2).



5. The Date Screen is displayed.



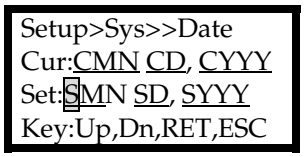
- Row **Curr** displays the current month on **CMN**, current date on **CD** and current year on **CYYY**.
- Row Set displays cursor at the head of **SMN** (on the S position) and is used to set the date. **SMN** displays the current month, **SD** displays the current date, and **CYYY** displays the current year as each initialization value. **SMN**, **SD** and **CYYY** are called Fields, and the Field on which a cursor lies is called a Current Field.
- To move the cursor from Current Field to the head character at the right Field, press **Shift+Down**.
- To move the cursor from Current Field to the head character at the left Field, press **Shift+Up**.

See next page for **Date Setup**.

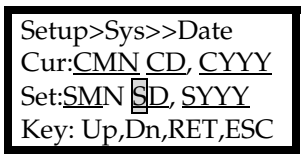
Continued on next page

Date Setup

1. Perform the following steps to set the desired date. The cursor is at SMN or move the cursor to SMN as described on the previous page.

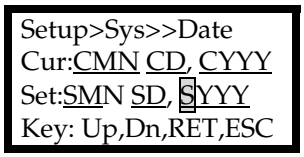


2. To set the month, press **Up** arrow to display the months in the order of "Jan, Feb, Mar, Apl, May, Jun, Jly, Aug, Sep, Oct, Nov, Dec" or press **Down** arrow to display the months in the reverse order. Once the desired month is displayed, press **Shift + Down** arrow to select the month and move the cursor to **SD** to display current date.



3. To set a date, press **Up** arrow to add 1 to the currently displayed date or press **Down** arrow to subtract 1 from the currently displayed date until the desired date is displayed. Once the desired date is displayed, press **Shift + Down** arrow to select the date and move the cursor to **SYYY** to display current year.

   Note: If the selected date exceeds the maximum date specified by SMN and SYYY, then the date automatically displays 1. For example, if the maximum specified date for the month of September is 30 and if you try to set a date beyond 30, then the date displayed is 1.



4. To set a year, press **Up** arrow to add 1 to the currently displayed year. However, if the year exceeds 2040, the year display automatically changes to 2000. Press **Down** arrow to subtract 1 from the currently displayed year. However, if the year is reduced beyond 2000, the year display automatically changes to 2040.
5. Press **RET** to setup the built-in calendar with the currently displaying contents, and Main screen menu is displayed. To cancel the current displayed contents, press **ESC**. The display shows the Main screen.

See next page for **Time Setup**.

Continued on next page

Time Setup

1. From the Main screen, press Setup>Sys>Date/Time to display the Date/Time screen. The iPrep™ Instrument uses the 24 hour clock.
2. Press **2** to display the Time screen.

```
Setup>Sys>>Time
Cur:CH:CM:CS
Set:SH:SM:SS
Key:Up,Dn,RET,ESC
```

   - Row **Curr** displays the current hour on **CH**, current minute on **CM**, and current second on **CS** respectively, and updates every new minute.
   - Row **Set** displays the current hour on **SH**, current minute on **SM** and current second on **SS** as each initialization value, and positions a cursor at the head of **SH** (S position).
   - To move the cursor from Current Field to the head character at the right Field, press **Shift+Down**.
   - To move the cursor from Current Field to the head character at the left Field, press **Shift+Up**.
3. To set the current hour, press **Up** arrow to add 1 to the currently displayed hour or press **Down** arrow to reduce 1 from the currently displayed hour. Once the desired hour is displayed, move the cursor to **SM** to display the current minutes using **Shift + Down** arrow.

   Note: 0 is the lower limit and 23 is the upper limit for the hour settings.

```
Setup>Sys>>Time
Cur:CH:CM:CS
Set:SH:SM:SS
Key: Up,Dn,RET,ESC
```

4. To set the current minute, press **Up** arrow to add 1 to the currently displayed minute or press **Down** arrow to reduce 1 from the currently displayed minute. Once the desired minutes is displayed, move the cursor to **SS** to display the current seconds using **Shift + Down** arrow.

   Note: 0 is the lower limit and 59 is the upper limit for the minute settings.

```
Setup>Sys>>Time
Cur:CH:CM:CS
Set:SH:SM:SS
Key: Up,Dn,RET,ESC
```

5. To set the current second, press **Up** arrow to add 1 to the currently displayed second or press **Down** arrow to reduce 1 from the currently displayed second.

   Note: 0 is the lower limit and 59 is the upper limit for the seconds settings.
6. Press **RET** to setup the built-in Calendar with the currently displaying contents, and Main screen menu is displayed. To cancel the current displayed contents, press **ESC**. The display shows the Main screen.

Removing the iPrep™ Card

Important: Do not remove the iPrep™ Card while the instrument is **ON**. This stops the automated purification protocol and may cause corruption of liquid handling files. Remove the card as described below.

1. Ensure the power switch is on the **OFF** position.
2. Open the iPrep™ Card Slot.
3. Push the button located below the card slot to eject the card from the slot.

4. Pull out the card from the slot and place the card in the box. Store the card protected from light.

Note: The card is not completely ejected by pushing the button only. You need to pull the card out from the slot once the card is ejected slightly from the slot.

Continued on next page

Barcode Reader

If you wish to use the barcode reader for your samples, ensure that you have the ability to connect the iPrep™ Instrument to a computer using a RS232C serial cable supplied with the barcode reader.

1. Connect the barcode reader to the BCR inlet on the rear of the iPrep™ Instrument.

2. Connect one end of the RS232C serial cable to the RS232C port of the computer and the other end of the serial cable to PC inlet on the rear of the iPrep™ Instrument.

   Note: If your computer does not have a RS232C port, you need to use a commercially available USB to serial converter cable. Connect the USB end of the cable into the USB port on the computer and connect the serial end of the cable into the PC port of the iPrep™ Instrument. You may also need to install the driver software of the converter cable on the computer.

3. Prior to using the barcode reader for sample tracking, you need to install the barcode software on to your computer as described on the next page.

4. To read the barcode on the tubes, aim the barcode reader along the barcode and press the trigger. The red LED is emitted from the reading window. Successful barcode reading is indicated by an audible beep and a green spot on the barcode.

Continued on next page

Installing CommViewer Barcode Software

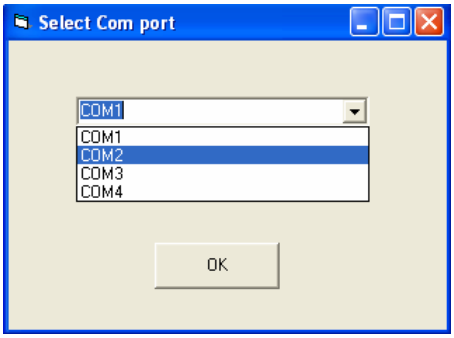
To use the barcode reader with your samples, you need to install the CommViewer Barcode software supplied with the instrument on your computer.

System Requirements

Compatibility:	Microsoft® Windows®, not compatible with Macintosh® computers
Operating system:	Windows® 98 SE, ME, 2000, and XP
Built-in memory:	64 MB or higher
Computer:	Pentium 233 MHz or higher

1. Insert the CommViewer Barcode software CD-ROM included with the instrument into the CD-ROM drive of the computer (connected to the iPrep™ Instrument using the RS232C serial cable as described on the previous page).
2. Open the CommViewer folder. Double click the **setup.exe** file to begin installation of the CommViewer Barcode software.
3. The CommViewer-InstallShield Wizard guides you through the installation process using the following steps. Once the Welcome Window appears, click **Next**.
   - This window allows you to select a folder to install the CommViewer program. To select the default folder, click **Next**. To install the program in your folder of choice, click **Change** to select the appropriate folder. After selecting a folder, click **Next**.
   - Click **Install** to install the CommViewer software components.
   - After installation is complete, click **Finish** to exit the installation completion window. At the end of installation, the CommViewer shortcut is created on your desktop.
4. Once the software is installed, open the CommViewer program to upload data from the iPrep™ Instrument by double clicking the CommViewer shortcut shown below on your desktop.

5. Select the communication port (COM 1-4) on the computer that connects to the RS232C serial cable from the iPrep™ Instrument. After selecting the port, click **OK**.



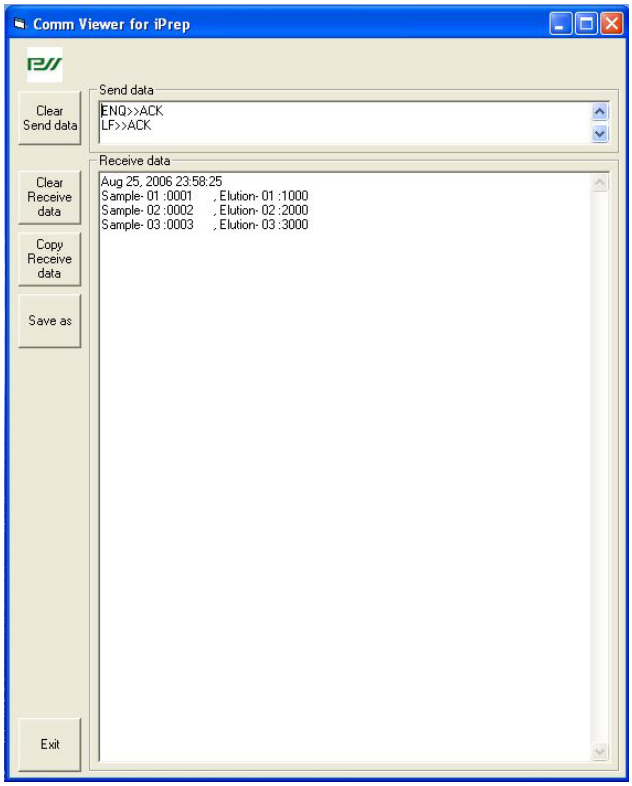
Continued on next page

Installing CommViewer Barcode Software, continued

Note: If the computer has only one COM port, the default selection of COM1 may work. However, if the computer has more than one COM ports, select the appropriate COM port. If you use USB to Serial Converter cable, the COM port is mostly COM3 or COM4.

6. Once the communication port is selected the CommViewer window appears. This window shows you the barcodes that are read. To read the barcode, see page 27.

   When reading the barcodes using the barcode reader connected to the iPrep™ Instrument, the digital display on iPrep™ screen prompts you to Press **1** to output data. On pressing 1, the barcode data read using the barcode reader appears in the Receive Data window.



7. Select the **Clear Receive Data** to clear the data. The received barcode data may include additional information such as time. Remove any additional information using the backspace or delete keys on your computer.
8. To save the refined data with a suitable file name in an appropriate folder, select the **Save As** option.
9. To copy the data directly into another program as text or spreadsheet, select the **Copy Receive Data** option. All data displayed in the Receive Data box are copied. Open an editor or spreadsheet program and paste the barcode data using the **Paste** menu.
10. Click on **Exit** to close the window.

Using the iPrep™ Purification Instrument

Introduction

Instructions are provided in this section to prepare the iPrep™ Purification Instrument with the iPrep™ disposables supplied with each iPrep™ Kit for nucleic acid purification.

Materials Needed

You will need the following items. Ordering information is on page xvi.

- iPrep™ Kits
- iPrep™ Protocol Cards
- Samples
- Barcode labels for sample and/or elution tubes, if you wish to read barcodes

Sample Preparation

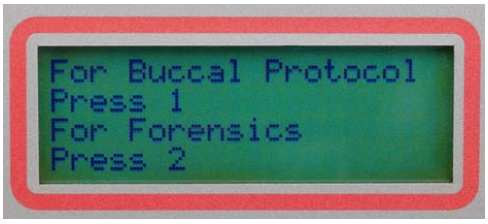
Sample preparation protocols are included in the manual supplied with the iPrep™ Kits or available for downloading from www.invitrogen.com. Be sure the sample is prepared and ready for loading onto the instrument before turning **ON** the instrument.

Insert the Card

Insert the appropriate protocol card into the iPrep™ Instrument as described on page 16.

Be sure to insert the card before turning **ON** the instrument. Once in the main menu, press **Start** to run the protocol.

Make sure that the appropriate iPrep™ Protocol Card is inserted in the instrument and the protocol name is displayed as shown.



Proceed to assembling the iPrep™ Platform as described on the next page.

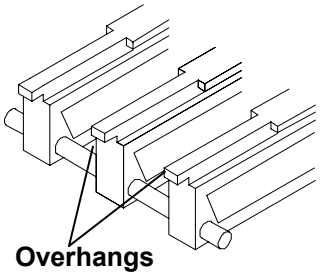
Continued on next page

Assembling the iPrep™ Cartridge Rack

Instructions are provided below to assemble the iPrep™ Reaction Cartridges on the iPrep™ Cartridge Rack.

1. Open the instrument door and remove the iPrep™ Cartridge Rack and iPrep™ Tip and Tube Rack from the instrument.
2. Remove the Reaction Cartridges from the iPrep™ Kit box. You need one Reaction Cartridge per sample. To collect any solution from the foil, tap the cartridge to deposit the solution at the bottom of the tube.
3. Orient each Reaction Cartridge with the arrow pointing towards the Cartridge Rack. Slide the cartridge in the direction of the arrow along the groove until the cartridge reaches the end of the groove. Push down the cartridge under the overhang part (see figure below) of the rack. You will hear a click if the cartridge is placed correctly on the rack.

   Important: Do not just place the cartridge on the rack. You need to slide the cartridge into the rack and push down. Do not load reagent cartridges from other manufacturer's on to the iPrep™ Cartridge Rack.



4. Repeat Step 3 until you have finished loading the desired Reaction Cartridges (up to 13 cartridges) onto the Cartridge Rack.

   Note: You can load 1-13 cartridges on the rack depending on the number of samples that you wish to process. If you are loading less that 13 cartridges, ensure than the remaining plastic ware (tips and tubes) are also loaded in the same order as the cartridges.
5. Place the Cartridge Rack with the cartridges on the instrument platform as shown below. Orient the rack such that the last two positions (one well and one hole face the back of the instrument and fit onto the heating block (located on the back of the platform). The reagent filled wells with the top dot faces the front of the instrument.

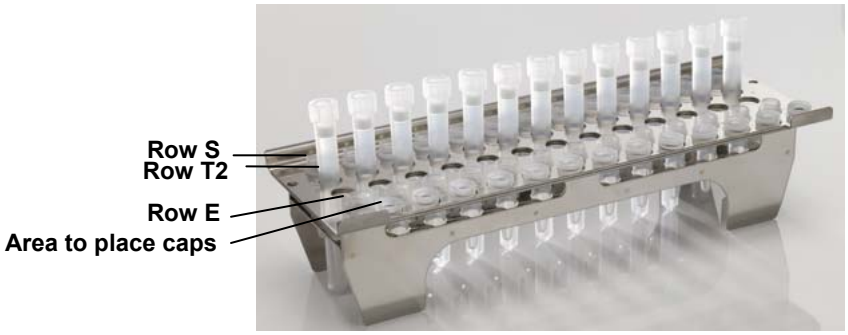
Continued on next page

Assembling the iPrep™ Tip and Tube Rack

Instructions are provided below to assemble the tips and tubes on the iPrep™ Tip and Tube Rack.

1. Remove the iPrep™ Sample Tubes from the iPrep™ Kit box.
2. Place the iPrep™ Sample and Elution Tubes without caps in row marked as **E** for eluting the DNA. Place the tube cap on the rack as shown below.
3. Remove the iPrep™ Tips from the iPrep™ Kit box. Place the iPrep™ Tips with Tip Holders in row marked as **T2**, leaving row marked as **T1** empty. Do not remove the tips from the holders.
4. Place another set of iPrep™ Sample and Elution Tubes **without the lid** in row marked as **S**. Add the sample to each tube (see the iPrep™ Kit manual for sample preparation details and sample volume recommendations).

   The final assembly of iPrep™ Tip and Tube Rack is shown below:



5. If you wish to read the barcode on your sample and elution tubes or record the sample and elution tube number, see next page for details. If you do not wish to read the barcode, proceed to the next step below.
6. Place the iPrep™ Tip and Tube Rack containing the tips and tubes on the instrument platform as shown below. Orient the rack such that the flat end of the rack is in the back of the platform and row E is facing the front.

Once you have assembled the iPrep™ Cartridge Rack and iPrep™ Tip Rack, you are ready to start the purification protocol as described on page 31.

Continued on next page

Reading the Sample Tube Barcode

Instructions to read the barcode on your sample and elution tubes using the barcode reader included with the iPrep™ Instrument are described below.

If you have a problem reading the barcode or do not have barcode labels, you can also record the sample and elution tube numbers without using the barcode reader as described below.

You can read the barcode on a set of 3 samples at a time.

1. Connect the barcode reader to the BCR port on the rear of the iPrep™ Instrument (page 21). This is not needed if you are only recording the sample numbers.
2. Connect the iPrep™ Instrument to a computer using a RS232C serial cable to the PC port on the rear of the iPrep™ Instrument (page 21). Install the barcode reader software on the computer as described on page 22.
3. Insert the appropriate the protocol card into the iPrep™ Card inlet as described on page 16 and select the appropriate protocol.
4. Navigate to the sample barcode screen after loading the cartridges. Press **1** to read the barcode on sample tubes.

```
Do you wish to read
sample bar codes
Press 1 for Yes
Press 2 for No
```

5. The sample tube barcode reading screen is displayed with the cursor on the first sample to be read.

Screen 1

```
Sample 1:1
Sample 2:2
Sample 3:3
Rtn: Next; Esc: Prev
```

6. Press the selected number for that sample on the iPrep™ keypad. For example, to read the first sample, press 1 on the keypad.

Screen 2

```
Sample 1: Lane 1
0-9, Up,Dn,BS,ESC,Rtn
>
>
```

Continued on next page

Reading the Sample Tube Barcode, continued

Procedure continued from previous page

7. At this point you have the following options:
   - Read the **barcode** on the sample 1 tube. Aim the barcode reader along the barcode and press the trigger. The red LED is emitted from the reading window. Successful barcode reading is indicated by an audible tone and a green spot on the code. The barcode (an example barcode 123456789 is shown in the screen below) appears on line 3 of the iPrep™ screen as shown below.

Screen 3

```
Sample 1: Lane 1
0-9, Up,Dn,BS,ESC,Rtn
>123456789
>Hit any key
```

   - To only **record the sample number** without using the barcode reader, type in the number of the sample using the iPrep™ keypad (0-9). The number keypad allows you to type in the respective number and the **Up** and **Down** arrow keys allow you to scroll through the alphabet, in case you wish to read letters. The **BS** key is a backspace key that deletes the last digit/character. If you enter the sample number manually, press **Return** to go to Screen 3 (above). Use **ESC** to go from Screen 2 to Screen 3 without the need to read a sample.
8. Press **Hit any key** to return to Screen 1, previous page. Press **2** from Screen 1 to read the barcode for sample 2 followed by pressing 3 to read the barcode for sample 3. When the barcode from all 3 samples are read, press **Return** (Rtn) to read barcodes on samples 4-6. If you do not wish to read barcodes for all samples, press **Return** again to have the option to read samples 7-9 without reading samples 4-6. You need to scroll through all samples to complete the reading screens and move to the next data output screen.
9. After reading the last set of sample barcodes or recording the sample numbers, the screen prompts you to load the reagent cartridges, tips and tip holder followed by elution tubes. Press **1** to continue. See next page to read elution tube barcodes.

Continued on next page

Reading the Elution Tube Barcode

1. The elution barcode screen is displayed. Press **1** to read the barcode on elution tubes.

   Note: If you have read the sample tube barcode, you have the option to read the elution tube barcode. It is not necessary to read the elution tube barcode, if you have read the sample tube barcode and is dependent on the barcode system that you are using.

   ```
   Do you wish to read
   elution bar codes
   Press 1 for Yes
   Press 2 for No
   ```

2. The elution tube barcode reading screen is displayed with the cursor on the first tube to be read. Press the selected number for that sample on the iPrep™ keypad. For example, to read the first elution tube barcode, press **1** on the keypad.

   ```
   Elution 1:1
   Elution 2:2
   Elution 3:3
   Rtn: Next; Esc: Prev
   ```

3. Read the barcode on the elution tube. Aim the barcode reader along the barcode and press the trigger. The red led is emitted from the reading window. Successful barcode reading is indicated by an audible tone and a green spot on the code. The barcode appears on line 3 of the iPrep™ screen 2 as shown on the previous page.
4. To record the elution tube numbers only without using the barcode reader, see Step 7, previous page for details.
5. Continue reading the barcode on all 13 elution tubes as described on the previous page.
6. After reading the last set of elution tube barcodes, proceed to output data as described on the next page.

Continued on next page

Transferring Barcode Data

After reading the sample and elution tube barcodes, you need to transfer the barcode data to a computer using the RS232C serial cable connecting the iPrep™ Instrument to a computer (see page 21 for details).

1. After reading the last set of elution tube barcodes, you have the option to output data.

Do you wish to output data? Press 1 for Yes Press 2 for No

   Note: To output data, ensure that the iPrep™ Instrument is connected to a computer using the RS232C serial cable, the CommViewer Barcode reader software is installed on the computer (page 21), and the CommViewer program is started.

2. Press **1** to output data. The confirmation screen is displayed as follows:

Ensure PC connected via RS232C Press 1 to continue Press ESC for Prev

3. Press **1** to continue. The following transmission status screens are displayed on the iPrep™ depending on whether the transmission was successful or rejected.

Successful	Rejected	Timeout
Transmission Status Successful Press any key to continue	Transmission Status Rejected Retry? 1: Retry; ESC: Abort	Transmission Status Timeout Retry? 1: Retry; ESC: Abort

4. On pressing 1, the barcode data read using the barcode reader also appears in the Receive Data window on the CommViewer window of the barcode reader software as shown on page 22.

5. After successful transmission, press any key to continue with the purification protocol as described on the next page. The elution volume screen is displayed.

   If data send is rejected, press **1** to retry sending the data. If there is no response from the computer (>3 seconds) when the data is transmitted, the timeout screen is displayed. Ensure that the computer is **ON** and the CommViewer software is installed. Press **1** to retry sending the date.

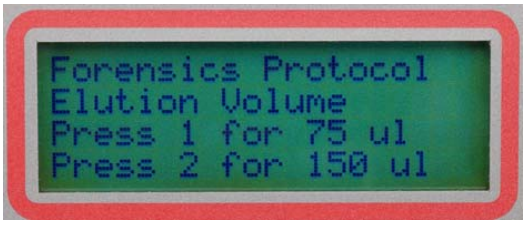
   Pressing **ESC** aborts the data but continues with the purification protocol and the elution volume screen is displayed.

Continued on next page

Performing the Purification Protocol

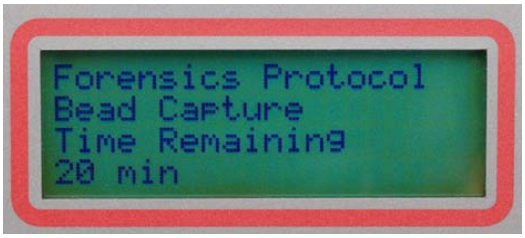
After assembling the iPrep™ Racks with components, start the purification protocol.

1. Close the instrument door. **The instrument does not work if the door is open.**
2. Select the appropriate elution volume on the display.



3. Confirm that you have selected the correct purification protocol, elution volume and have loaded the plasticware and racks properly. Ensure that the sample tube **without lids** (containing the sample) and elution tubes **without caps** are placed in the correct positions on the iPrep™ Tip and Tube Rack (see page 26 for details).
4. Press **Start**. The automated purification protocol begins and various steps of the protocol including the approximate time remaining are displayed on the digital display.

   Important: Do not open the door once the protocol has begun. To pause or stop the protocol, see next page.



5. At the end of the run, the instrument beeps briefly and digital display shows **Protocol Finished** for 10 seconds. The Main menu appears after 10 seconds.
6. Open the instrument door. Remove and cap the elution tubes containing the purified nucleic acid. Store the purified nucleic acid appropriately as described in the iPrep™ Kit manual.
7. Discard the used cartridges, tips, and sample tube into biohazard waste. Do not reuse the cartridges.
8. To process more samples using the same iPrep™ Protocol Card, load the racks with new cartridges, tips, tubes, and sample, and start the protocol as described above.

Continued on next page

Performing the Purification Protocol, continued

9. To process more samples using another iPrep™ Protocol Card, close the instrument door and turn the power switch to **OFF**. Remove the iPrep™ Protocol Card as described on page 20. Insert the new iPrep™ Protocol Card, load the racks with new reagent cartridges, tips, tubes, and sample, and start the protocol as described above. There is no cooling period required between runs.
10. If you are not using the instrument, close the instrument door and turn the power switch to **OFF**. Remove the iPrep™ Protocol Card as described on page 20.

See page 37 for cleaning and maintenance of the iPrep™ Instrument.

Note

In case of an **external power failure** (loss of electricity or the electrical cord is accidentally removed from the outlet), the purification protocol stops. When the power resumes, the digital display shows the main screen and the protocol cannot be continued. An error is logged. To view the error, see page 36. If the tips are still on the Syringe unit when the power resumes, manually return the tip to the origin as described on the next page.

Pausing or Canceling the Protocol

1. Press the **Stop** key to pause the protocol. The display shows the following:

2. To resume the protocol after a pause, press the **Start** key. The protocol continues from the last step prior to the pause.
3. To cancel/stop the protocol, press the **Stop** key twice. The instrument will stop after the current step is completed. The screen returns to the Main screen.

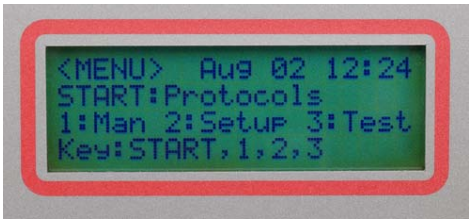
Since the protocol is interrupted, the axes do not move to the original positions. To move all axes to the original position, go to the **Manual** screen as described on the next page.

Continued on next page

Manual Screen

To manually move the axis or return the tip to the origin after a manual stop:

1. Press **1** to go to the **Manual** screen from the Main screen.



2. From the Manual screen, you can select **1** to move all axes to the original positions, **2** to return the Tips to Tip Holders and move all axes to original positions, or **3** to clean.

3. Depending on when the protocol was stopped or cancelled,
   - Press **2** to return the Tips to Tip Holders, if tips need to be returned to the holders. The instrument also moves all axes to the original position.
   - Press **1** to go to the **ORG** display to move all axes to the origin, if the tips do not need to be returned to the holders.

   Once in the **ORG** screen, you can individually move each axis to the origin by pressing **1**, **2**, **3**, **4**, respectively, or press **0** to return all axes to the origin.

4. The **Clean** option allows you to clean the piercing unit which may get dirty over time. To clean the piercing unit, press **3** from the Manual screen.

   The **Manual** option displayed on the Clean screen allows you to clean the piercing unit manually using an alcohol wipe. By pressing the **Manual** option, the piercing unit is lowered so you can access the unit for cleaning.

5. Press **ESC** to return to Main menu. You are now ready to a run a new protocol.

Performing Instrument Tests

Introduction

Instructions are included below to perform few tests to ensure proper functioning of the instrument.

Materials Needed

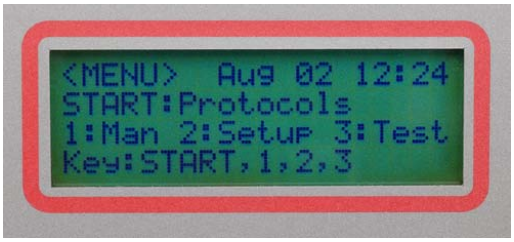
- iPrep™ Protocol Card

To run the Axis test, you will need plastic disposables supplied with the iPrep™ Instrument:

- iPrep™ Tips
- iPrep™ Tip Holders
- iPrep™ Reaction Cartridges

Performing Tests

1. Insert the iPrep™ Protocol Card (available separately, page xvi) into the card slot on the instrument as described on page 16.
2. Turn **ON** the instrument. The Main screen is displayed.



3. Press **3** to display the Test screen.

4. The types of tests are displayed on the screen.
   - **Axis** test allows you to check movements of all axes
   - **Temp** (Temperature) test allows you to ensure the heating block is heating correctly to the desired temperature
   - **Ver** (Version) test allows you to see the actual version of the firmware
   - **Error** test allows you to view the error history including the code of the last error that occurred

   Depending on the test that you wish to run, select the appropriate keys to perform the tests as described on the next page.

Continued on next page

Performing Instrument Tests, Continued

Axis Test

Perform the Axis Test as follows. We recommend that you perform this test monthly as an internal check.

1. Press **1** from the Test screen.
2. Load the iPrep™ Cartridge Rack with 13 empty reaction cartridges supplied with the instrument. Place the loaded rack on the iPrep™ Platform as described on page 25.
3. Load the iPrep™ Tip and Tube Rack with tips and tubes as described on page 26. Be sure to load tips with tip holders in rows **T1** and **T2**.
4. The next screen confirms if all plastic disposables are loaded on the platform. When the plastic disposables are set up correctly, press **Start** to begin the test. The duration of the test is ~3 minutes.

During the Axis test all well/hole positions are checked by moving tips on each position. The display indicates the status of the test. At the end of the test, the screen displays ALL OK if no problem is detected. If a problem is detected, the error screen with the appropriate error code is displayed (see next page for error screen).

5. Press **ESC** to return to the Test screen.

Temperature Test

To perform the Temperature Test:

1. Press **2** from the Test screen.
2. The Temp Test screen is displayed. The preset temperature is set to 25ºC.

3. Change the temperature up to 80ºC in 0.1ºC increment using the **Up** arrow.
4. After the desired temperature is set, press **Start** to run the test or press **ESC** to return to the **Test** Screen.

Continued on next page

Temperature Test, continued

5. Compare the **Now Temp** value with the desired **Set Temp** value displayed on the screen. The **Now Temp** value should reach the **Set Temp** value after a few minutes of starting the test. After reaching the set value, the **Alarm** value, displayed on the screen should turn to **00**.

6. Press **ESC** to return to the Test Screen. Press **ESC** again to return to the Main screen.

Note: After completing the **Temp** test, the temperature is automatically set to the preset value of 25ºC. To cool down the heater unit to this preset value, turn **off** the instrument. The temperature of the heater unit cools down at a rate of about 1ºC per minute. Do not start a new purification protocol before the preset temperature is reached.

Version Test

To perform the Version Test:

1. Press **3** from the Test screen.
2. The Version screen is showing the actual version of the firmware is displayed.

3. After confirming the version, press **ESC** to return to the Main screen.

Error Test

To view the error code:

1. Press **4** from the Test screen.
2. The Error screen with the error code is displayed.

3. After viewing the error, press **ESC** to return to the Main screen.

Cleaning and Maintaining the iPrep™ Instrument

Introduction

Refer to the instructions below to clean and maintain the iPrep™ Instrument.

Maintenance Schedule

Two types of maintenance are performed on the iPrep™ Instrument as listed in the table. For details on each type of maintenance, see below:

Maintenance Type	Performed by	Schedule
Routine		
• Cleaning of platform surface (racks and bottom tray)	User	After each use
• Maintaining the D-ring	User	Bi-weekly
• Replacing the D-Ring	User	Annually
Preventive	Service Engineer	Annually

Cleaning Parts

Clean the metal bottom tray, iPrep™ Cartridge Rack, and iPrep™ Tip and Tube Rack with mild detergent and rinse with deionized water. Allow the parts to dry before use. Clean and disinfect the platform surface by wiping with deionized water followed by 70% ethanol.

Continued on next page

Maintaining D-Rings

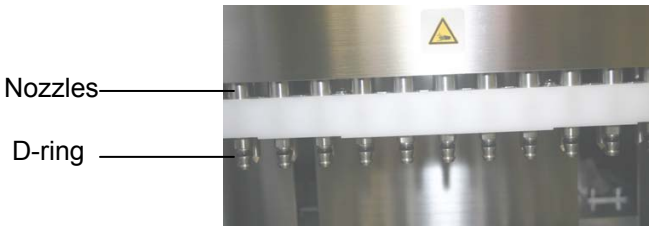
Every 2 weeks, we recommend applying silicon grease (supplied with the instrument) to the D-rings attached to the nozzles to maintain proper attachment of the tips to the nozzles and prevent any leakage as described below.

To replace D-rings, see below.

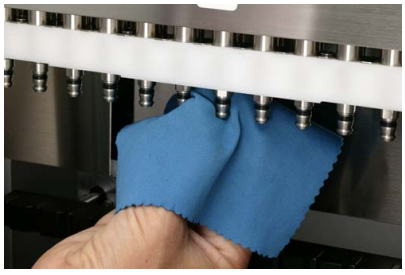
- Using a gloved hand, take some silicon grease on the finger.

  Note: If you have used up the grease included with the instrument, you can use any vacuum type silicon grease.

- Apply the silicon grease on the surface of the D-rings attached to the nozzles as shown below. Avoid putting any grease into the nozzle. If you accidentally put some grease into the nozzle, remove the grease using a wire.



- Wipe off any excess grease on the nozzles edges using laboratory wipes as excess grease interferes with the operation of the instrument.



For any other repairs and service, contact Technical Support (page 45). Do not perform any repairs or service on the iPrep™ Instrument to avoid any damage to the instrument.

Replacing the D-Rings

Once a year, we recommend replacing the D-rings attached to the nozzles to maintain proper attachment of the tips to the nozzles and prevent any leakage as described below.

One set of 13 D-Rings are included with the iPrep™ Instrument. To obtain more D-Rings, contact Technical Support (page 45).

1. Using a small forceps or pliers, remove each D-Ring from the nozzle by pulling out the D-Ring and then sliding out the D-Ring from the nozzle.
2. Apply some silicon grease to the nozzle.
3. Remove one D-Ring from the package and slide on the D-Ring on the greased nozzle. Ensure the D-Ring is placed properly on the nozzle to prevent any leakage.

Note: General recommendation is to replace the D-rings after about 100-150 extractions.

Troubleshooting

Introduction

Review the information below to troubleshoot your experiments using the iPrep™ Purification Instrument and iPrep™ Kits.

To maintain proper functioning of the iPrep™ Instrument, we recommend that you perform the routine and preventive maintenance as described on page 37.

Problem	Cause	Solution
Instrument Problems		
No power (the digital display remains blank and the fan does not run when the power is turned on)	AC power cord is not connected	Check AC power cord connections at both ends. Use the correct cords.
	Fuse has blown	Replace the fuse (page 44). If the problem still persists after verifying that correct power cord is used and the fuse is replaced, contact Technical Support (page 45) for a service engineer.
No display (fan turns on when the power is on)	iPrep™ Card is not inserted correctly	Turn **OFF** the instrument and re-insert the iPrep™ Card in the proper orientation into the iPrep™ Card slot and be sure to insert it completely into the slot by manually pushing the card. See page 16 for details.
	iPrep™ Card is inserted when the instrument is ON	Ensure the iPrep™ Instrument is **OFF** prior to inserting the Card. If the card is inserted while the instrument is **ON**, the card is not recognized and nothing is displayed on the digital display.
Error code displayed	--	Make a note of the error code and see the list of error codes on page 42. If your specific error code **is** listed on the list on page 42, you need to contact Technical Support (page 45) for a service engineer. If your specific error code **is not** listed on the list on page 42, press **ESC** to return to the Main screen and start the protocol again. If the error still remains, turn **OFF** the instrument and remove the iPrep™ Protocol Card, and. Allow the instrument to cool for an hour and restart the instrument after inserting the iPrep™ Protocol Card. If the error still remains, contact Technical Support (page 45) for a service engineer.
Accidentally missed adding tips or tubes	--	Be sure to confirm that you have added the cartridges, tips and tubes in the correct order prior to starting the protocol. If you missed adding the plasticware, **do not open the door to stop the protocol.** Pause the protocol by pressing **Stop** once. Open the door to add the missing plasticware and resume the protocol.
Protocol stops after an initial start	iPrep™ Door opened during the run	**Do not** open the iPrep™ Door during the protocol. If you wish to pause the protocol, press **Stop** to pause the protocol as described on page 32. This allows you to resume the protocol after the pause. By opening the door during the protocol, you cannot resume the protocol after the pause and you may loose your samples.

Continued on next page

Problem	Cause	Solution
Protocol stops after an initial start	Plasticware incorrectly loaded on the iPrep™ Rack	Do not just place the cartridge on the rack. You need to slide the cartridge into the rack and push down as described on page 25. While loading the tubes on the iPrep™ Tip and Tube Rack, be sure the tubes are **uncapped**. If the plasticware are incorrectly loaded, the purification protocol still starts as there are no sensors on the instrument to detect incorrect placements. Once the protocol begins, the piercing unit may collide with the incorrectly placed cartridges or the tips may encounter a barrier (when capped tubes are inserted) which triggers an error message causing the instrument to stop.
	iPrep™ Racks incorrectly loaded on the instrument	Be sure to load the iPrep™ Cartridge Rack first followed by the iPrep™ Tip and Tube Rack as described. If the iPrep™ Racks are incorrectly loaded, the purification protocol still starts as there are no sensors on the instrument to detect incorrect placements. Once the protocol begins, the instrument may experience liquid handling problems which triggers an error message causing the instrument to stop.
Bubbles formed during purification	Missed adding sample or sample volume is lower than the recommended volume	Be sure to add the sample to tubes prior to starting the protocol. To ensure proper mixing of reagents in the tip and prevent bubble formation during mixing, make sure the sample volume is at least the recommended volume listed in the manual supplied with iPrep™ Kits.
Filter barrier on the tip is wet	Missed adding sample or sample volume is lower than the recommended volume	Be sure to add the sample to sample tubes and the sample volume must be at least the recommended volume listed in the manual supplied with the iPrep™ Kit to prevent bubble formation. Bubbles can wet the filter barrier on the tip, resulting in inefficient dispensing with the tips that may affect the yield.
Presence of buffer in the Bottom Tray	Motor movements may not be smooth, incorrect placement of plasticware, or leakage from tips	Perform preventive maintenance annually to ensure proper motor movements. If you are loading less than 13 cartridges, ensure that the remaining plastic ware (tips and tubes) are also loaded in the same order as the cartridges to prevent any spillage. See below for leakage from tips.
Leakage from tips or uneven liquid handling between nozzles	D-Rings are not greased regularly or are very old	Perform routine maintenance of the D-Rings (applying grease and changing the D-Rings) are described on page 38 for proper performance of the instrument and prevent any leakages.
Blockage of tips	Too much starting material causing clumps or aggregates	Decrease the amount of starting material. Use the recommended amount of starting material as listed in the iPrep™ Kit manual.

Continued on next page

DNA Quality Problems		
Problem	**Cause**	**Solution**
Low DNA yield	Incomplete lysis	Decrease the amount of starting material used. Be sure to add Proteinase K during lysis, if included in the protocol. Make sure that the sample is completely immersed in the Lysis Buffer.
	Poor quality of starting material	Be sure to process sample immediately after collection or store the sample at appropriate temperature. The yield and quality of DNA isolated depends on the starting material.
	Insufficient amount of magnetic beads added	During shipping, some GeneCatcher™ Magnetic bead solution may adhere to the sealing foil of the cartridge. To collect any bead solution from the foil, tap the cartridge to deposit the bead solution at the bottom of the tube.
	Clogged tips resulting in DNA loss	Ensure that the lysate does not contain any particulate material that can clog the tip. If needed, centrifuge the sample prior to iPrep™ purification (see iPrep™ Kit manual for details).
No DNA recovered	Magnetic beads stored or handled improperly	Store cartridge containing the beads at room temperature. Do not freeze the cartridge as the beads may be irreparably damaged. Make sure that the beads are in solution at all times and do not dry. Dried beads are non-functional.
	Accidentally missed adding tubes or tips	Be sure to add the sample and elution tubes (especially the tube in cartridge position 11 for Blood protocol) prior to starting the protocol. If you are loading less than 13 cartridges, ensure that the remaining plastic ware (tips and tubes) are also loaded in the same order as the cartridges to avoid any sample loss.
Eluate containing DNA is discolored	Magnetic beads present in the eluate	Remove any magnetic beads using a magnetic separator (MagnaRack™ is available from Invitrogen, see page xvi) or centrifuge the sample in a microcentrifuge for 1 minute at maximum speed.
	DNA contaminated with heme	Minimize the amount of blood or blood-stained sample used (≤ 20 µl blood spot for forensics sample).
DNA is sheared or degraded	Bubbles formed during mixing steps	To prevent bubble formation during mixing, make sure the sample volume is at least the recommended volume listed in the manual supplied with iPrep™ Kits.
	Purified DNA repeatedly frozen and thawed	Aliquot purified DNA and store at 4°C (short-term) or -20°C (long-term). Avoid repeated freezing and thawing.
	DNA contaminated with DNases	Maintain a sterile environment while working (*i.e.* wear gloves and use DNase-free reagents).

iPrep™ Instrument Error Codes

Introduction

This section describes the error codes displayed by the iPrep™ Instrument when it encounters a problem.

1. Make a note of the error code including the line number and contact Technical Support (page 45). Note that the error codes listed in the table below cannot be fixed by the user. A service engineer will be send to resolve the error.
2. After recording the error code, press **ESC** to return to the Main screen.
3. Press **1** to select the Man screen and return the tips to the original position by pressing **2** as described on page 33. Remove the card and turn **OFF** the instrument.

If the protocol is interrupted by an error, the protocol cannot be resumed from the interrupted point. You need to move the axis to the original position, solve the error before starting the protocol again from the beginning.

Code	Problem	Code	Problem
10	Failed return to origins, protocol can't run	143	Does not match delimited character
11	Limit error, protocol can not run	144	Unexpected number of character strings behind
12	Failed to return to Z Axis, protocol in run	150	Invalid parentheses position
13	Failed to return to P axis, protocol in run	151	Invalid big parentheses position
14	Failed to return to M axis, protocol in run	160	Does not match variable/conversion table
15	Failed to return to Y axis, protocol in run	161	Does not match with system variable with ( )
16	Z axis limit error, protocol in run	170	Assigned variable is already registered in VT
17	/	171	Invalid variable name to be registered
18	/	180	Non numeric data
19	Y axis end limit, protocol in run	181	Set Value of system variable is out of range
20	Z axis time out, protocol in run	190	Not variable and constant
21	P axis time out, protocol in run	200	Invalid " " position
22	M axis time out, protocol in run	210	Label overlapped
23	Y axis time out, protocol in run	211	Invalid label name to be registered
24	Open door in motion	220	VP table Number has not yet been assigned
25	Abnormal input from bottom sensor in motion	221	Overlapped VP table data
26	Failed to initialize heating block	232	Read data smaller than the first in VP table
27	Failed to initialize motion control board	233	Too much data in VP table
110	System error; (Assigned greater than 10).	250	Argument is not correct
111	Script buffer overflowed	251	Number of argument is too much

Continued on next page

iPrep™ Instrument Error Codes, Continued

Code	Problem	Code	Problem
113	Parameter buffer overflowed	300	Protocol failed to pick up tip
114	Parameter storage buffer pointer overflowed	301	Protocol failed to eject tip
115	Label storage buffer overflowed	302	Protocol failed to aspire
116	Label pointer buffer overflowed	303	Protocol failed to dispense
117	No terminal code found in script file	304	Protocol failed to set temperature
118	Function buffer overflowed	305	Protocol failed to read temperature
119	Function pointer buffer overflowed	306	Protocol failed to key in
120	No. of character of data read is overflowed	307	Protocol failed to input variable
121	No. of character of one command in script file is overflowed	308	Protocol failed to add variable
122	Number of character of variable overflowed	309	Protocol failed to subtract variable
123	Number of character of label overflowed	310	Protocol failed to find jumping address
124	Function character is to long	311	Protocol failed to set pause period
130	Invalid command name	312	Protocol function nesting level is over limited
140	No data in one line		
141	No data at the assigned position		
142	Assigned site found, yet no data there		

Appendix

Replacing the Fuse

Replacing the Fuse

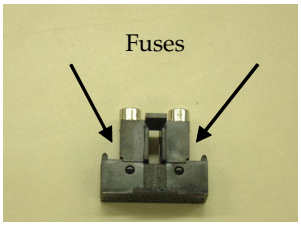
Extra fuses are supplied with the iPrep™ Instrument. For additional fuses, contact Technical Support (page 45).

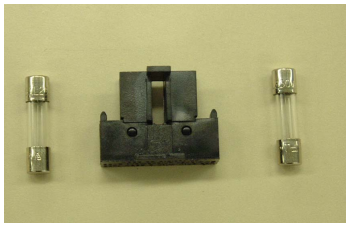
Instructions are provided below to replace the 3.15 A fuse for the main power socket.

Note: The 6.3 A fuse included with the iPrep™ Instrument are for internal parts (CPU, motor driver, heater) of the instrument. Do not attempt to change 6.3 A fuse for these internal parts. Contact Technical Support (page 45) for a service engineer, if the 6.3 A fuse needs replacement.

1. Turn **off** the main power switch at the rear of the instrument and detach the power cord from the rear of the instrument.
2. Open the fuse compartment located on the rear of the instrument using a small flat blade screwdriver to gently pry open the fuse compartment.

3. Pull the fuse holder out of the compartment and inspect the fuse. If the fuse is burned or there is a break in the fuse element, replace the 3.15 A fuse with the identical type fuse (see figure below).





4. Place the fuse holder back into the compartment and snap the cover closed.

Technical Support

Web Resources

Visit the Invitrogen Web site at **www.invitrogen.com** for:

- Technical resources, including manuals, vector maps and sequences, application notes, MSDSs, FAQs, formulations, citations, handbooks, etc.
- Complete technical support contact information
- Access to the Invitrogen Online Catalog
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Contact Us

For more information or technical assistance, call, write, fax, or email. Additional international offices are listed on our Web page (www.invitrogen.com).

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Purchaser Notification, Continued

iPrep™ Purification Instrument Warranty

Invitrogen warrants to the original purchaser ("Purchaser") that the iPrep™ Purification Instrument ("Instrument") will be free from defects in materials and workmanship for a period of one (1) year from the date of delivery. Invitrogen agrees, as its sole responsibility under this limited warranty, and upon prompt notice of a defect, to repair, replace or refund purchase price, at its discretion, any Instrument discovered to be defective within the warranty period. This warranty does not include repair, replacement, or refund necessitated by accident, abuse, neglect, misuse, unauthorized repair, or modification of the Instrument.

In the event that Invitrogen determines that the Instrument is in need of repair and not replacement, this Standard Warranty includes replacement parts and labor for the Instrument. This Standard Warranty does not include shipment of the Instrument to and from service location or travel cost of service engineer, the costs of which shall be borne by the Purchaser.

This Warranty and the remedies set forth herein are exclusive and in lieu of all other express or implied warranties (including implied warranties of merchantability, fitness for a particular purpose and non-infringement), and no other warranties shall be binding upon Invitrogen. In no event shall Invitrogen be liable for any special, incidental or consequential damages resulting from the use or malfunction of this Instrument or the system With which it is used, even if such damages could be anticipated by Invitrogen.

To obtain service during the warranty period, contact Invitrogen Technical Support for further instruction.

OUT OF WARRANTY SERVICE

Contact Invitrogen Technical Support. We will be happy to assist you by phone at no charge. Repair service, if needed, will be billed depending on the parts replaced and labor hours needed to repair your instrument. You will be billed for shipment of the instrument to the recommended service facility.

For research use only. Not intended for any animal or human therapeutic or diagnostic use.