



Promega

## Technical Bulletin

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# DNA IQ™ Reference Sample Kit for Maxwell® 16

INSTRUCTIONS FOR USE OF PRODUCT AS1040.

**Caution:** Handle cartridges with care; seal edges may be sharp.



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# DNA IQ™ Reference Sample Kit for Maxwell® 16

All technical literature is available on the Internet at: [www.promega.com/protocols/](http://www.promega.com/protocols/)  
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## 1. Description

The DNA IQ™ Reference Sample Kit<sup>(a)</sup> for Maxwell® 16 is used with the Maxwell® 16 Instrument to provide an easy method for efficient, automated purification of genomic DNA from forensic and paternity reference samples. The Maxwell® 16 Instrument is supplied with preprogrammed purification procedures and designed for use with predispensed reagent cartridges, maximizing simplicity and convenience. The instrument can process up to 16 samples in approximately 15–20 minutes, and the purified DNA can be used directly in genetic STR amplification reactions for forensic profile analysis.

The DNA IQ™ Reference Sample Kit for Maxwell® 16 uses the DNA IQ™ Resin to purify samples, providing consistent DNA concentration and reliable STR analysis. The Maxwell® 16 Instrument is a magnetic-particle-handling instrument that efficiently transports the DNA IQ™ Resin through purification reagents in prefilled cartridges (Figure 1), mixing the resin with the reagents during processing. The paramagnetic-based methodology avoids common problems experienced with automated systems, such as clogged tips or partial reagent transfers, which can lead to suboptimal purification.

## 2. Product Components and Storage Conditions

Product	Size	Cat.#
DNA IQ™ Reference Sample Kit for Maxwell® 16	48 preps	AS1040

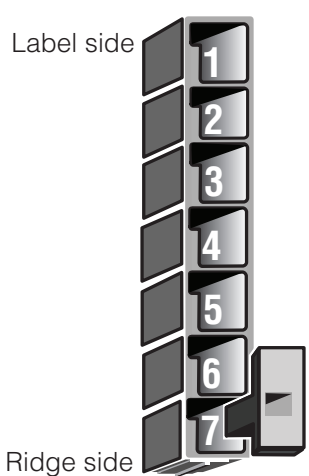
For Research Use Only. Not for use in diagnostic procedures. Sufficient for 48 automated isolations from forensic reference samples. Includes:

- 48 DNA IQ™ Reference Sample Cartridges
- 50 Plungers
- 50 Elution Tubes
- 20ml Elution Buffer
- 25ml Lysis Buffer

**Storage Conditions:** Store the DNA IQ™ Reference Sample Kit for Maxwell® 16 at 15–30°C.

**Safety Information:** The reagent cartridges contain ethanol, isopropanol and guanidine thiocyanate. These substances should be considered flammable, harmful and irritants.

	Contents	User Adds:
Label side	1 Lysis Buffer	Sample
	2 DNA IQ™ Resin	
	3 Lysis Buffer	
	4 Wash Buffer	
	5 Wash Buffer	
	6 Wash Buffer	
Ridge side	7 Empty	Plunger



**Figure 1.** DNA IQ™ Reference Sample Cartridge.

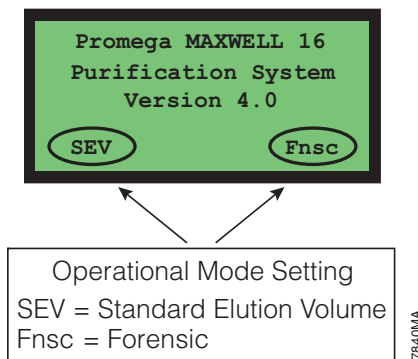
## 3. Maxwell® 16 Instrument Hardware and Firmware Setup

The Maxwell® 16 Standard Elution Volume (SEV) Instrument is required for the DNA IQ™ Reference Sample Kit for Maxwell® 16. Users with a Maxwell® 16 LEV Instrument need to reconfigure their instrument using the Maxwell® 16 SEV Hardware Kit (Cat.# AS1200). Reconfiguring the instrument is simple and easy. For instructions to properly set up the instrument, please refer to the *Maxwell® 16 Instrument Technical Manual*.

The first time the Maxwell® 16 Instrument is powered up, a series of user prompts will appear on the Navigation LCD. The DNA IQ™ Reference Sample Kit for Maxwell® 16 is intended to be used with the SEV settings and Forensic method on the instrument. Once the Forensic method is set up on the instrument, all subsequent power-ups of the instrument will default to these settings automatically.

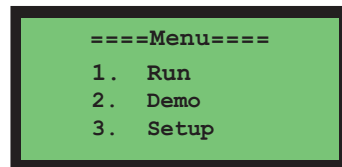
After completing firmware setup, the LCD should display the following screen:

**Note:** Your instrument should display Version 4.0 or higher.

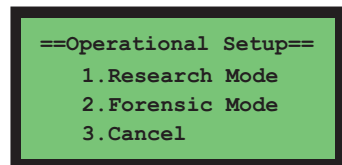


Before beginning purification using the DNA IQ™ Reference Sample Kit for Maxwell® 16, it is necessary to setup the Forensic method as follows:

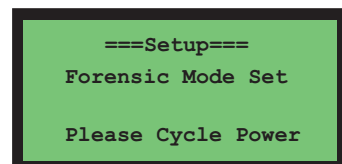
1. Turn on the instrument. At the Menu screen, use the Scroll Down button on the Navigation LCD to move the cursor to choice #3 "Setup".



2. Press the Run/Stop button to select.
3. At the Setup screen, use the Scroll Down button on the Navigation LCD to move the cursor to choice #2 "Forensic Mode".

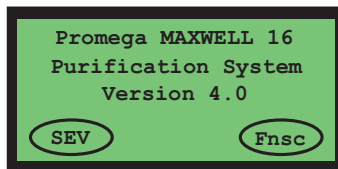


4. Press the Run/Stop button to select.
5. After pressing the Run/Stop button, turn the Maxwell® 16 Instrument off, wait a few seconds then turn it back on to cycle the power.

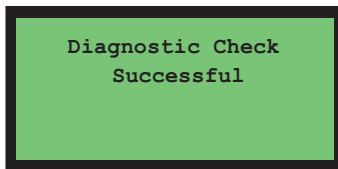


### 3. Maxwell® 16 Instrument Firmware Setup (continued)

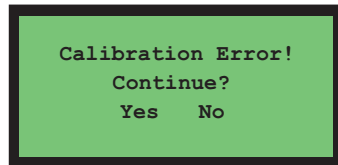
6. After turning the power on, you will briefly see a screen indicating the firmware version number, and in the bottom right-hand corner the text “Fncs”, the abbreviation for Forensic Mode. Each time the instrument is turned on after this point, Forensic Mode will be the default setting.



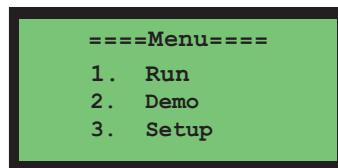
7. The instrument will automatically perform a diagnostic axis check to ensure the instrument is functioning properly. A screen will briefly appear indicating the test was successful.



If the diagnostic axis check was not successful, a “Calibration Error” screen will be shown. Refer to Section 6 if this occurs.



8. If the diagnostic check was successful, the Menu screen will appear. No additional setup is required. The instrument is now ready to purify forensic or paternity samples using the DNA IQ™ Reference Sample Kit for Maxwell® 16.



**Note:** The default settings can be changed to accommodate future laboratory needs. To change the default settings, refer to Step 1 above.

## 4. Sample Preprocessing

### Materials to Be Supplied by the User

- 1M DTT
- 70°C heat block or water bath (for buccal swab preprocessing)
- 95°C heat block or water bath (for FTA® card preprocessing)
- Microtubes, 1.5ml (Cat.# V1231)
- DNA IQ™ Spin Baskets (Cat.# V1221)
- aerosol-resistant micropipette tips

### 4.A. Preparation of Lysis Buffer for Sample Preprocessing

1. Determine the volume of Lysis Buffer to be used (see Table 1) and add 1µl of 1M DTT for every 100µl of Lysis Buffer.

**Note:** If a precipitate forms, warm the Lysis Buffer to 37–60°C until it clears (no more than 5 minutes).

2. Mix by inverting several times.
3. If preparing the entire bottle of Lysis Buffer, mark and date the label to record the addition of DTT. This solution can be stored at room temperature for up to one month if sealed.

**Table 1. Amount of Lysis Buffer Required Per Sample.**

<u>Material</u>	<u>Lysis Buffer</u>
Cotton swab	500µl
FTA® blood punch	500µl
<u>Liquid blood</u>	<u>N.A.</u>

N.A. Not applicable.

### 4.B. Preprocessing Protocol by Sample Type

#### Liquid Blood Samples

No preprocessing is necessary for purification of DNA from liquid blood samples. Go to Section 5 for instructions to process 20µl of liquid blood using the Maxwell® 16 Instrument.

#### 4.B. Preprocessing Protocol by Sample Type (continued)

##### FTA® Blood Card Samples

**Note:** Blood card samples stored on filter paper other than FTA® (e.g., S&S 903) also may be processed using this method.

1. Place two 3mm FTA® blood punches in a 1.5ml Microtube (Cat.# V1231) and add 500µl of prepared Lysis Buffer containing DTT (see Table 1). Close the lid and heat at 95°C for 30 minutes.

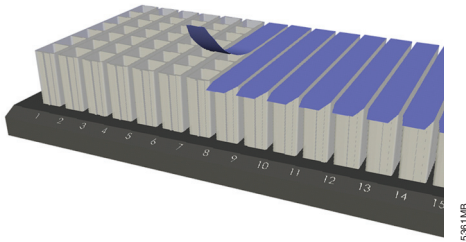
**Note:** If you experience problems with tube caps opening during incubation, a 70°C incubation may be used instead. Final DNA concentration may vary when using a lower incubation temperature. Alternatively, use a caplock to keep the lid closed.

2. Label a DNA IQ™ Spin Basket (Cat.# V1221) and place into a fresh 1.5ml Microtube.
3. After the 95°C incubation, briefly vortex the 1.5ml Microtube to recover any evaporated liquid on the sides of the tube.
4. Carefully open the lid of the Microtube, transfer the Lysis Buffer and FTA® punches to the Spin Basket, and close the Microtube lid.
5. Centrifuge at room temperature for 2 minutes at maximum speed. Carefully remove the Spin Basket.
6. Close the lid of the Microtube and save until ready for automated DNA extraction using the Maxwell® 16 Instrument (Section 5).

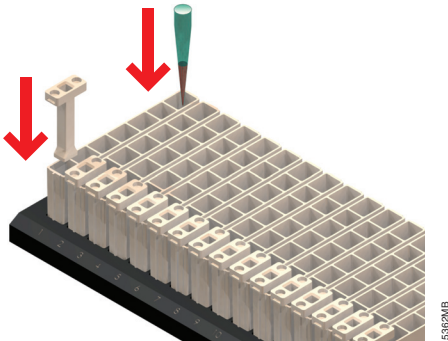
##### Buccal Swab Samples

1. Place one half of a cotton buccal swab in a 1.5ml Microtube (Cat.# V1231) and add 500µl of prepared Lysis Buffer containing DTT (see Table 1) to the Microtube. Carefully close the lid and heat at 70°C for 30 minutes.
2. Label and place a DNA IQ™ Spin Basket (Cat.# V1221) into a fresh 1.5ml Microtube.
3. After the 70°C incubation, briefly vortex the 1.5ml Microtube to recover any evaporated liquid on the sides of the tube.
4. Carefully open the lid of the Microtube, transfer the Lysis Buffer and swab sample to the Spin Basket, and close the lid of the Microtube.
5. Centrifuge at room temperature for 2 minutes at maximum speed. Carefully remove the Spin Basket.
6. Close the lid of the Microtube and save until ready for automated DNA extraction using the Maxwell® 16 Instrument (Section 5).

## 5. Maxwell® 16 Automated DNA Purification



1. Place the number of cartridges to be used into the cartridge preparation rack. Place each cartridge into the holder with the ridged side of the cartridge (Figure 1) facing towards the numbered side of the rack. Hold the cartridge firmly and remove the seal.



2. Place one plunger into well #7 of each cartridge. (Well #7 is the well closest to the ridged side of the cartridge).  
**Note:** The plunger will fit loosely in the cartridge.
3. Transfer your sample into well #1. (Well #1 is the well closest to the cartridge label and furthest from the user).  
**Note:** For liquid blood samples, pipet the contents of well #1 to rinse the transfer pipette tip of any residual blood. This step may increase the final DNA concentration.
4. Turn the Maxwell® 16 Instrument on. The instrument will power up, display the firmware version number, proceed through a self-check and home all axes.

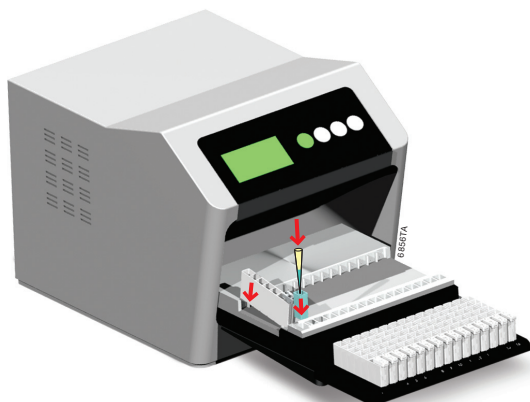
5. Maxwell® 16 Automated DNA Purification (continued)



5. Open the door when prompted to do so on the LCD display. Press the “Run/Stop” button to extend the platform.



Warning. Pinch point hazard.



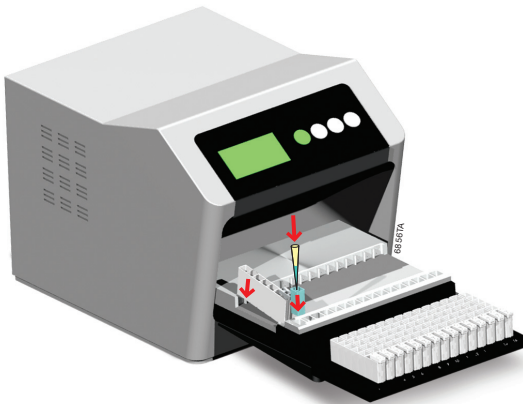
6. Transfer cartridges from the cartridge preparation rack onto the Maxwell® 16 platform. Ensure that the cartridges are placed into the Maxwell® 16 Instrument with the ridged side of the cartridge closest to the door. The cartridges will only fit into the instrument in this orientation. If you have difficulty fitting the cartridge onto the platform, check that the cartridge is in the correct orientation.

**Notes:**

- It is easiest to insert the cartridge by inserting the ridged side first and then pressing down on the back of the cartridge to “click” it into place.
- If you are processing fewer than 16 samples, center the reagent cartridges on the platform, spacing them evenly outwards from the center.



Do not start the instrument prior to performing Step 7.



7. Place blue Elution Tubes into the elution tube slots at the front of the platform. Add 300 $\mu$ l of Elution Buffer to each Elution Tube.

**Note:** Ensure that the correct volume of Elution Buffer has been added to the Elution Tubes prior to starting the automated method.

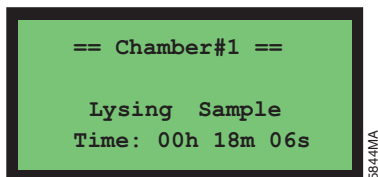


8. Press the “Run/Stop” button. The platform will retract. Close the door.



Warning. Pinch point hazard.

5. Maxwell® 16 Automated DNA Purification (continued)

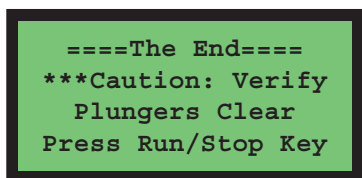


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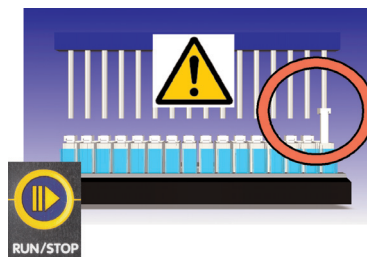
9. The Maxwell® 16 Instrument will immediately begin the purification run. The LCD screen will display the steps performed and the approximate time remaining in the run.

**Notes:**

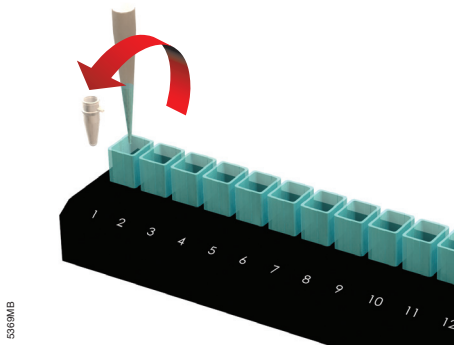
- Pressing the “Run/Stop” button or opening the door will pause the run. Close the door (if open), and select whether to continue or terminate the run.
- If the program is terminated before completion, the instrument will wash the particles off the plungers and eject the plungers into well #1 of the cartridge.



5318MA



10. When purification is complete, the LCD screen will display a message that the method has ended. Upon method completion, open the instrument door. Check to make sure that all of the plungers have been removed from the magnetic rod assembly. If the plungers have not been removed, push them down gently by hand to remove them from the magnetic rod assembly.
11. Press the “Run/Stop” button to extend the platform.



12. Remove the Elution Tubes from the heated elution tube slots, and place them into the Magnetic Elution Tube Rack. Allow any residual DNA IQ™ resin to collect on the magnetized side of the blue elution tube. The amount of resin in the samples will vary with sample size and composition. Transfer the eluted samples into storage tubes by pipetting.



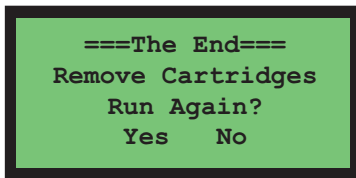
Warning. Hot surface. Burn hazard.

**Note:** To avoid particle transfer, use a pipette tip to aspirate samples away from the captured particles on the side of the blue elution tube.



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13. Remove cartridges and plungers from the instrument platform and discard. Do not reuse reagent cartridges, plungers or Elution Tubes.



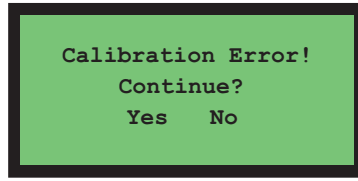
5817MA

14. Use one of the scroll (up/down) buttons to move the cursor to select “Yes” or “No” to run the purification method again.

If “Yes” is selected, the Menu screen will appear (see Section 3, Step 8).

If “No” is selected, the platform is retracted back into the instrument. You are then prompted to close the door.

5. Maxwell® 16 Automated DNA Purification (continued)



15. A diagnostic axis check is automatically performed whether another run is chosen or not. If the check is successful, the LCD screen will display a message indicating so. If the check is unsuccessful, an error message will appear. Refer to Section 6 for further information about resolving the error.

6. Troubleshooting

For questions not addressed here, please contact your local Promega Branch Office or Distributor. Contact information available at: [www.promega.com](http://www.promega.com). E-mail: [techserv@promega.com](mailto:techserv@promega.com)

Symptoms	Causes and Comments
Low DNA concentration	<p>Insufficient sample was processed:</p> <ul style="list-style-type: none"> <li>• Add more starting material for preprocessing to increase yield.</li> <li>• Optimize the preprocessing incubation temperature to improve final DNA concentration.</li> </ul>
Poor STR quality	<p>Too much starting material. Reduce the amount of sample used for purification.</p> <p>Wrong elution buffer was added. Use only the Elution Buffer supplied with the DNA IQ™ Reference Sample Kit for Maxwell® 16.</p>
Instrument calibration error	<p>Verify nothing is physically blocking the movement of the platform, plunger bar or magnetic rod assembly.</p> <p>Turn the machine off and then on to cycle the power. The instrument will rehome itself. If the calibration error occurs again after power cycling, please contact Promega for service.</p> <p>After cycling power, run a “Demo” method without any cartridges in the machine. If another calibration error occurs during the “Demo” run, please contact Promega for Service.</p>

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