



Promega

Technical Bulletin

Maxwell® 16 Flexi Method Firmware

INSTRUCTIONS FOR USE OF PRODUCT AS6411.



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Maxwell® 16 Flexi Method Firmware

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of this system. E-mail: techserv@promega.com

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1. Description

The Maxwell® 16 Flexi Method Firmware^(a) allows you to create custom methods when isolating DNA, RNA or recombinant protein with the Maxwell® 16 Instrument. You can optimize purification from challenging sample types or unique applications with ease using the Maxwell® 16 Instrument. The Maxwell® 16 Flexi Method Firmware allows you to set sample processing times for lysis, binding, drying and elution. In addition, the number of passes can be customized for particular samples. The Maxwell® 16 Flexi Method Firmware enables you to program five custom methods: 1) Standard Elution Volume (SEV) DNA, 2) SEV RNA, 3) SEV Protein, 4) Low Elution Volume (LEV) DNA and 5) LEV RNA. The Maxwell® 16 Flexi Method Firmware is password-protected to prevent unauthorized access.

The Maxwell® 16 Flexi Method Firmware can be purchased as an option when purchasing a Maxwell® 16 Instrument (Cat.# AS2000). Alternatively the firmware can be purchased separately to install on an existing Maxwell® 16 Instrument (Cat.# AS1000 or AS2000).

2. Product Components and Storage Conditions

Product	Size	Cat.#
Maxwell® 16 Flexi Method Firmware	1 each	AS6411

3. Before You Begin

3.A. Maxwell® 16 Instrument Hardware Setup

The Maxwell® 16 Instrument can be configured with either the Maxwell® 16 SEV Hardware Kit (Cat.# AS1200) or Maxwell® 16 LEV Hardware Kit (Cat.# AS1250) (Figures 1 and 2). The Maxwell® 16 Instrument must be configured with the appropriate conversion kit to use the respective cartridge. Use only the SEV hardware configuration with SEV-configured reagent products and LEV hardware configuration with LEV-configured reagent products. Failure to use the appropriate combination of hardware and cartridge configuration can result in instrument damage. Refer to the *Maxwell® 16 Instrument Operating Manual* #TM295, for directions on how to configure the instrument.



Figure 1. The LEV configuration of the Maxwell® 16 Instrument.

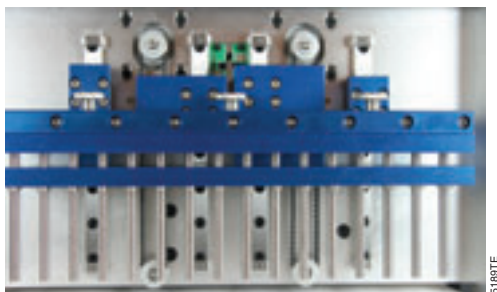


Figure 2. The SEV configuration of the Maxwell® 16 Instrument.

3.B. Maxwell® 16 Flexi Method Firmware Download Instructions

To install the Maxwell® 16 Flexi Method Firmware follow the instructions shown below. Downloading the Maxwell® 16 Flexi Method Firmware to the instrument will not change the operational mode or hardware settings on your instrument, nor will it overwrite previously set user-defined variables.

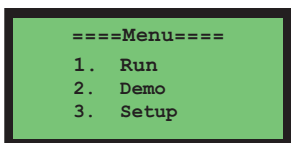
Before downloading the Flexi Method Firmware, make a note of the firmware version currently loaded on your instrument. You will need this number if you wish to re-load your original firmware in the future. The version number appears on the Maxwell® 16 Instrument startup screen and can be viewed by turning your instrument off and then on again. If you wish to revert to your former version of firmware, please contact Technical Services.

1. Turn the Maxwell® 16 Instrument power on.
2. Connect the RS232 cable from a computer to the Maxwell® 16 Instrument.
3. Follow instructions in the CD-ROM user interface to download the method.
4. Carefully read the End User License Agreement. Select “Yes” to accept the terms of this license and download the Maxwell® 16 Flexi Method Firmware.
5. Select the COM port to which the RS232 cable is attached on your computer.
6. Select “Download” in the firmware downloader.
7. Select “OK” after reading the warning message.
8. Wait for the firmware downloader to display the message “Download Complete”. This will take approximately 2 minutes. The Maxwell® 16 Instrument will reboot itself upon completion of firmware download.

3.C. Changing the Operational Sample-Processing Mode

Before using the capabilities of the Maxwell® 16 Flexi Method Firmware, you need to change the processing mode of the instrument. After the Maxwell® 16 Flexi Method Firmware is downloaded, the instrument will be in the mode that was set previous to download (Research or Forensic mode). Any changes made to the user-defined variables in the Maxwell® 16 Flexi Method Firmware will not be implemented unless the instrument is set to User mode. Follow the instructions below to change the processing mode of the instrument. These instructions can also be used to reset the instrument processing mode to Forensic or Research, which will run Maxwell® 16 cartridges using standard settings.

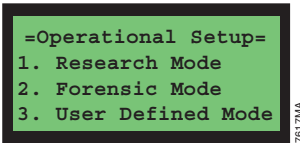
1. From the Maxwell® 16 Menu screen select “Setup”, and push the RUN/STOP button.



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3.C. Changing the Operational Sample-Processing Mode (continued)

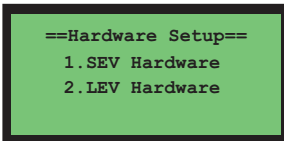
2. The Operational Setup screen allows you to choose the processing mode for the instrument. To run methods with standard settings in Research mode, select "1. Research Mode". To run methods with standard settings in Forensics mode, select "2. Forensics Mode". Selecting "3. User Mode" allows you to run both Research Mode and Forensic Mode methods but with user-defined settings for binding time, lysis time, drying time, elution time and number of passes for DNA, RNA or recombinant protein purification in the SEV hardware configuration or DNA and RNA purification in the LEV hardware configuration. Select the appropriate mode, and push the RUN/STOP button.



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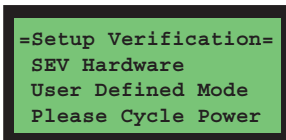
3. The Hardware Setup screen allows you to choose whether the instrument is configured with SEV or LEV hardware. Choose the appropriate configuration for the instrument hardware that is installed or will be installed, and press the RUN/STOP button.

Note: The instrument firmware settings need to match the hardware configuration of the instrument. Failure to match the Maxwell® 16 Instrument firmware and hardware configuration settings could result in instrument damage.



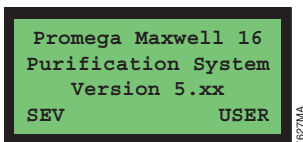
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4. A Setup Verification screen is then displayed so that you can confirm the choices you have just made. The new settings will take effect after the instrument power is cycled. Turn off the instrument power, then turn it back on to cycle the power.



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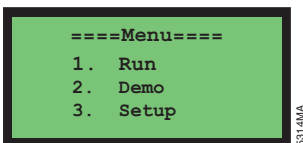
5. The first screen displayed on the LCD panel after restarting the instrument will show the firmware version, hardware configuration and processing mode that have been set. Confirm that the firmware version is 5.XX, where "XX" refers to the firmware version specified on the CD-ROM supplied with the Maxwell® 16 Flexi Method Firmware. Confirm that the processing mode has been changed to the desired setting ("Rsch" for Research Mode, "Fncs" for Forensic Mode or "User" for User Mode), and the instrument configuration (LEV or SEV) is appropriate to the hardware currently installed on the Maxwell® 16 Instrument.



3.D. Entering User-Defined Variables for Sample Processing

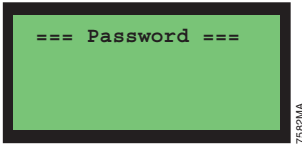
The Maxwell® 16 Flexi Method Firmware allows you to adjust the settings for several parameters used during sample processing on the instrument. Parameters that can be modified are lysis time, binding time, drying time, elution time and number of passes through the cartridge. Different parameter settings can be made for DNA, RNA and Protein (SEV only) methods. However, only one set of parameters at a time can be saved for each method in LEV and SEV modes. User-defined settings are password-protected to ensure that any modifications made to the processing parameters are not inadvertently changed. The instructions shown below indicate how to make user-defined changes to these parameters or reset default values. Alternatively you can use the instructions in Section 3.C to change back to Research or Forensic mode, which will run all methods in standard mode.

1. From the Menu screen on the Maxwell® 16 LCD panel, press the MENU button.

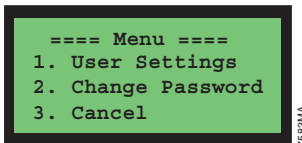


3.D. Entering User-Defined Variables for Sample Processing (continued)

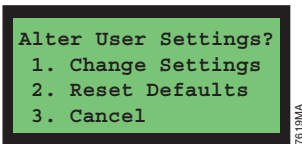
2. You must enter a password to alter user settings. The default password for the Maxwell® 16 Flexi Method Firmware is DOWN, DOWN, DOWN, DOWN (i.e., press the DOWN arrow key four times). This password can be changed by following the instructions in Section 4. Enter the appropriate password to continue.



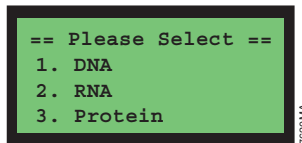
3. From the menu screen select "1. User Settings", and press the RUN/STOP button.



4. On the screen labeled "Alter User Settings?" select "1. Change Settings", and press the RUN/STOP button to enter user-defined parameters for a method. Select "2. Reset Defaults" to reset method parameters for a particular method to the default settings (shown in Table 1). If "Reset Defaults" was selected, the methods selected will have the values identical to those in Table 1. Resetting the default settings will only affect the method selected (DNA, RNA or Protein) and will not affect settings in other methods or the corresponding SEV or LEV version settings.

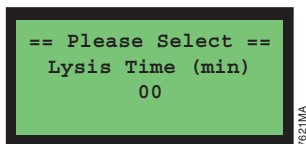


5. Select the DNA, RNA or Protein (SEV only) method that will be modified to the user-defined settings. Select the appropriate method type from the list using the UP and DOWN arrow keys, and press the RUN/STOP button. This is the final screen presented for resetting defaults.



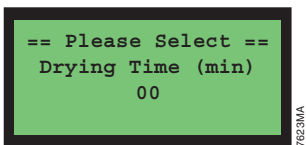
6. "Lysis Time (Min)" accepts values of 0 to 60 minutes for the lysis time of the method. Use the UP and DOWN arrow keys to increase or decrease the number of minutes, then press the RUN/STOP button to accept the selection.

Note: This is the amount of time that the plunger mixes the sample before addition of MagneSil® particles to the sample.



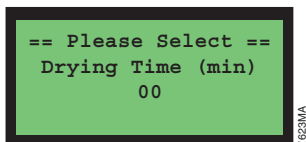
7. "Binding Time (Min)" accepts values of 0 to 60 minutes for the binding time of the method. Use the UP and DOWN arrow keys to increase or decrease the number of minutes, then press the RUN/STOP button to accept your selection.

Note: This is the amount of time that the plunger mixes the sample after addition of MagneSil® particles to the lysed sample. During this time the nucleic acid or protein is binding to the MagneSil® particles.



8. "Drying Time (Min)" accepts values of 0 to 60 minutes for the drying time of the method. Use the UP and DOWN arrow keys to increase or decrease the number of minutes, then press the RUN/STOP button to accept the selection.

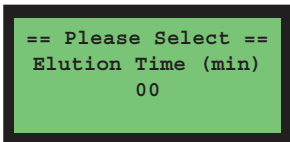
Note: This is the amount of time prior to elution that the particles are air-dried.



3.D. Entering User-Defined Variables for Sample Processing (continued)

9. "Elution Time (Min)" accepts values of 0 to 60 minutes for the elution time of the method. Use the Up and Down arrows to increase or decrease the number of minutes, then press the RUN/STOP button to accept the selection.

Note: This is the amount of time that the plunger is used to mix particles in the elution buffer.

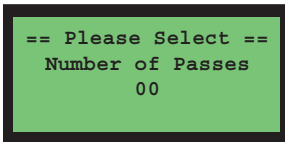


```
== Please Select ==  
Elution Time (min)  
00
```

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10. "Number of Passes" accepts values of 1 to 5 passes. Use the UP and DOWN arrow keys to increase or decrease the number of passes, then press the RUN/STOP button to accept the selection.

Note: This is the number of times the entire process will be repeated.



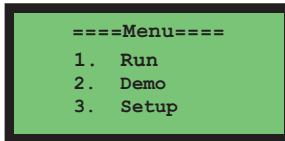
```
== Please Select ==  
Number of Passes  
00
```

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3.E. Reviewing the User-Defined Variables for Sample Processing

It is possible for any user to review the user-defined settings that are entered into the Maxwell® 16 Flexi Method Firmware prior to processing samples. Follow the instructions below to view the user-defined parameters that are set for the method of interest. It is necessary to be in the User mode to view the user-defined parameters. To place the Maxwell® 16 Instrument in User mode, see Section 3.C.

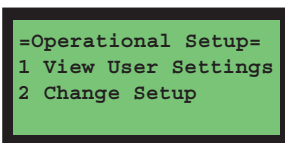
1. From the Menu screen select "Setup", and press the RUN/STOP button.



```
====Menu====  
1. Run  
2. Demo  
3. Setup
```

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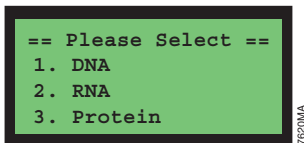
2. On the Operational Setup menu select "1. View User Settings", and press the RUN/STOP button.



```
=Operational Setup=  
1 View User Settings  
2 Change Setup
```

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3. Select either DNA, RNA or Protein (SEV only) to view the user settings, and press the RUN/STOP button.



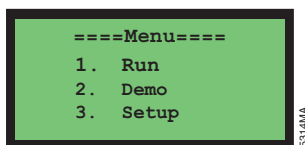
4. The user-defined parameters, including lysis, binding, drying and elution times and number of passes, for the selected method will be shown on the LCD. Cycle through the settings by pressing the RUN/STOP button to get to the next parameter.
5. If any of the parameters need to be changed prior to running the instrument, refer to Section 3.D to modify the parameters.

4. Changing the Password

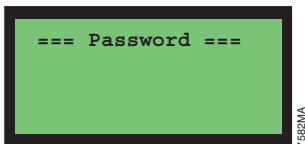
The Maxwell® 16 Flexi Method Firmware is password-protected such that it is necessary to enter a password to change the duration of the lysis, binding, drying and elution times and number of passes. Only one user-defined password can be set on the instrument at any given time. Please note that it is not necessary to enter the password to view the Maxwell® 16 Flexi Method Firmware settings. These settings can be viewed by selecting “Setup” at the Menu screen. The password can be changed by following the steps described below.

Contact Promega Technical Services if you have forgotten your password or need assistance in changing your password.

1. From the Menu screen press the MENU button.

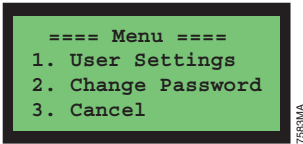


2. Enter the password. The default password is: “DOWN”, “DOWN”, “DOWN”, “DOWN” (i.e., press the DOWN arrow key four times).

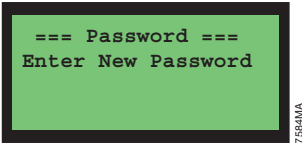


4. Changing the Password (continued)

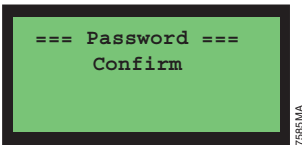
3. Select "2. Change Password".



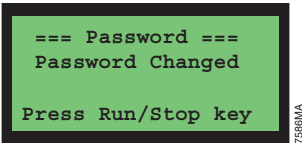
4. Enter a new password by pressing a combination of the keys "RUN/STOP", "MENU", "UP" and "DOWN". The password must be a sequence of 4 keys. Record the password you have chosen for future reference.



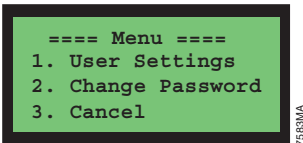
5. Confirm the Password.



6. A confirmation message will appear that the password has been changed. Press "RUN/STOP" to continue.



7. The Maxwell® 16 Instrument returns to the Menu screen after the password is changed.



5. Optimizing Settings with the Maxwell® 16 Flexi Method Firmware

The following is a list of the benefits and disadvantages of optimizing the steps of the Maxwell® 16 methods. For questions not addressed here, please contact your local Promega Branch Office or Distributor. Contact information available at: www.promega.com. E-mail: techserv@promega.com

Step	Benefits	Disadvantages
Lysis	Complete lysis of the sample is necessary to recover DNA, RNA or protein. The optimal lysis time for a specific sample type depends on the time required to adequately lyse the samples. Some samples will not require any lysis time in addition to the sample preprocessing steps, while other samples will benefit from an extended lysis time. For example, no additional lysis time may be required for the aqueous phase of a phenol:chloroform DNA or RNA purification. Alternatively, a longer lysis time may be required when isolating DNA from a strain of bacteria that is resistant to lysis.	Extended lysis times could result in the formation of precipitates, which may interfere with purification and downstream applications.
Binding	Maximal recovery requires efficient binding of the target molecule to the magnetic particles. Increasing the binding time can increase recovery of the target molecule.	Increased binding time may increase binding of the target molecules to the MagneSil® particles but also may increase carryover of detergents, contaminants and other components that may affect purity or inhibit downstream applications.
Drying	Excess alcohol from the wash buffers can interfere with downstream applications such as gel electrophoresis, PCR and enzymatic reactions. Increasing the drying time can remove excess alcohol from the target.	Overdrying can reduce removal of the target molecules from the MagneSil® particles, thereby reducing recovery.
Elution	Efficient recovery of the target molecules requires removal from the MagneSil® particles. Extending the elution time can enhance removal of the target molecules from the MagneSil® particles.	Excess elution time can result in the release of detergents and other components that may inhibit downstream applications. Also, the elution buffer could evaporate with long elution times.
Passes	Increasing the number of passes can result in greater recovery of target molecules.	Increasing the number of passes can result in the transfer of detergents, contaminants and other components that may inhibit downstream applications.

6. Processing Capacities of the Maxwell® 16 Instrument

The Maxwell® 16 Kits are optimized to purify DNA, RNA and protein from a variety of sample types. The capacity of the system can be exceeded by using too much sample. The processing capacity of the system depends on a variety of factors, such as sample size and type. Please see the Technical Manual for the appropriate Maxwell® 16 cartridges for processing capacities for a specific sample type.

7. Default Maxwell® 16 Instrument Settings for Flexi Methods

The default settings for the Maxwell® 16 Flexi methods are given in Table 1. Default times can be reset for the DNA, RNA and Protein methods in the SEV mode or DNA and RNA methods in the LEV mode.

Table 1. Maxwell® 16 Flexi Method Firmware Default Times (in Minutes).

Step	SEV			LEV	
	DNA	RNA	Protein	DNA	RNA
Lyse	2	1	15	1	3
Bind	2	3	2	7	2
Dry	3	2	0	1	3
Elute	3	3	3	5	5
Heat	Yes	No	No	Yes	No
Cycles	2	2	2	1	1

8. Standard Maxwell® 16 Instrument Settings for Standard Methods

The Maxwell® 16 Flexi Method Firmware is set to the default method settings, which are slightly different than those of the standard methods due to the need to set the times in minutes in the Flexi Method Firmware. Tables 2–4 list the times that are used for each method in the standard firmware.

Table 2. SEV Standard Method Times (in Seconds).

Step	DNA			RNA	Protein
	Blood or Cells	Tissue	Buffy Coat	Tissue or Cells	All Sample Types
Lyse	100	600	100	15	908
Bind	90	90	90	180	90
Dry	180	180	420	120	None
Elute	190	195	190	195	190
Heat	Yes	Yes	Yes	No	No
Cycles	2	2	2	2	2
Total	~36 minutes	~45 minutes	~50 minutes	~34 minutes	~43 minutes

Table 3. LEV Standard Method Times (in Seconds).

Step	RNA
Lyse	180
Bind	120
Dry	180
Elute	300
Heat	No
Cycles	1
Total	~36 minutes

Table 4. DNA IQ™ System Standard Method Times in the Forensic Mode (in Seconds).

Step	SEV	LEV
Lyse	10	10
Bind	360	420
Dry	60	60
Elute	190	300
Heat	Yes	Yes
Cycles	1	1
Total	~18 minutes	~28 minutes

9. Related Products

Instrument and Instrument Accessories

Products	Size	Cat.#
Maxwell® 16 Instrument*	1 each	AS2000
Maxwell® 16 LEV Hardware Kit	1 each	AS1250
Maxwell® 16 SEV Hardware Kit	1 each	AS1200

*For Laboratory Use.

Standard Elution Volume (SEV) Reagent Kits

Products	Size	Cat.#
Maxwell® 16 Blood DNA Purification Kit*	48 preps	AS1010
Maxwell® 16 Cell DNA Purification Kit*	48 preps	AS1020
Maxwell® 16 Tissue DNA Purification Kit*	48 preps	AS1030
DNA IQ™ Reference Sample Kit for Maxwell® 16**	48 preps	AS1040
Maxwell® 16 Total RNA Purification Kit*	48 preps	AS1050
Maxwell® 16 Polyhistidine Protein Purification Kit	48 preps	AS1060

*For Laboratory Use.

**For Research Use Only. Not for use in diagnostic procedures.

Low Elution Volume (LEV) Reagent Kits

Products	Size	Cat.#
Maxwell® 16 Cell LEV Total RNA Purification Kit*	48 preps	AS1225
Maxwell® 16 Tissue LEV Total RNA Purification Kit*	48 preps	AS1220
DNA IQ™ Casework Sample Kit for Maxwell® 16**	48 preps	AS1210

*For Laboratory Use.

**For Research Use Only. Not for use in diagnostic procedures.

^(a)Patents Pending.

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All prices and specifications are subject to change without prior notice.

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