

## RAS v 2.1 Operator Manual

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### 5.1 Intro:

An Assay Group is made of a sequence of **Assay Steps**, which describe the pipetting actions of the Mark5 and a collection of tests, which define the assays in the panel being prepared. An **Assay Step** may be either a **Sample Preparation Step**, or a **Reagent Addition Step**. The sequence of steps follows the assay protocol that comes with the kit. For example, pipette calibrators and controls, add reagent to reaction tubes, etc.

Each assay step is comprised of:

- A **Layout** which defines the organization of the racks on the Mark5
- **Sample Maps**, which define the locations from which the Calibrators, Controls, Samples and Reagents are aspirated.
- A **Dispense Map** which defines the contents of the reaction positions. There are two kinds of **Dispense Map**: one for a **Sample Preparation Assay Step** and one for a **Reagent Addition Assay Step**.
- A **Notepad**, which defines a message to be displayed and any delay before an **Assay Step** is performed.

### 5.2 Assay Group Editor View

The **Assay Group Editor** allows you to define a sequence of **Assay Steps** to control the Mark5. It also allows you to create new **Layouts** and racks for the Mark5. Double-clicking on the Assay Group Editor icon on your desktop can run the Assay Group Editor, or by finding the **RAS 2.1** group through Windows *Start | Programs*. When the editor starts up it is “empty”. You must either open an existing file containing a previously defined **Assay Group**, or create a new **Assay Group**.

#### 5.2.1 Assay Group Editor Areas

The **Assay Group Editor** window is split into four areas: the **Menu Bar**, the **Icon Bar**, the **Navigation Bar** and the **Graphical View** [Show Image]. The **Menu Bar** offers you choices for opening, editing and saving your **Assay Group**. The **Icon Bar** has the same selections presented in graphical format, the

**Navigation Bar** allows you to select the **Assay Step** and the rack in the **Layout**. The **Graphical View** illustrates either the entire layout for the deck of the Mark5, or the contents of the wells in the sample and dispense maps. Editing the layouts and sample or dispense maps is achieved by interacting with this view and is controlled by the control panel [refer to later sections]

### 5.2.2 Assay Group Editor Navigation

You can switch between the **Layout**, **Sample** and **Dispense** views by selecting the appropriate View option from the **Menu Bar**, or by pressing the correct icon [show and define icons]. The **Navigation Bar** allows you to switch between **Assay Steps** and between racks within the layout for each step. It also displays the step type and layout name [show Nav Bar]

## 5.3 Creating an Assay Group

To create a new **Assay Group**, select the *File | New* menu option. You will be prompted to create a new **Assay Step** [show image], and then asked to define a **Test** [show image]. The smallest **Assay Group** you can create will have one step, one test and one rack in the layout.

## 5.4 Saving an Assay Group, and Opening a Pre-Existing Assay Group

Once you have defined or edited an **Assay Group**, select *File | Save* option (Note: It is advisable to save all of your assay groups in the default location for ease of recovery). To open a pre-existing **Assay Group** for editing or to run an assay, use the *File | Open* option, and then select the appropriate **Assay Group** from the choices.

## 5.5 Creating and Editing Assay Steps

As mentioned earlier, each **Assay Group** is made up of a series of **Assay Steps**. Each step is either a sample or reagent handling operation on the Mark5. For example, in one step you would prepare your samples, while in another you would add reagent. The steps are performed sequentially, and each step can be used to prepare multiple assays.

### 5.5.1 Creating A New Step

To create a new step, open the **Step Editor** by selecting *Edit | Step* from the menu [show image]. Select the <New> button to bring up the **New Step** dialog box: [show image]

### 5.5.2 Naming Steps

You are required to give each **Assay Step** a unique name. The name can be up to 35 characters in length. You are also required to define an **Assay Step** type (either **Sample Preparation** or **Reagent Addition**).

Click on the <Browse> button to choose an existing **Layout** from the dialog box, or if you wish to create a new **Layout**, type a new name and select OK. The same layout can be associated with several different steps, meaning you only have to set the X Y position of the racks once.

### 5.5.3 Deleting Steps

Steps can be deleted with the <Delete> button, and the sequence in which the steps are performed can be changed by the <Up> and <Down> buttons that move the currently selected **Assay Step in the Assay Group** [show image].

## 5.6 Creating and Deleting Tests

The **Assay Group** is made up of a panel of assays. These assays are utilized on the **Worksheet Editor** when ordering tests before the worksheet is run. You can define samples to prepare, sample volumes, dispense heights and dispense speeds for each test. To create or delete a test, use the **Test Editor** by selecting *Edit | Tests* from the **Assay Group Editor**.

### 5.6.1 Creating Tests

Click on <New> in the **Test Editor Dialog** to add another assay to the panel. You must enter a **Test Name** of up to 3 characters and a **Test Description** (up to 35 characters). This list of tests is used throughout the **Assay Group** and can only be edited from the **Test Editor**.

### 5.6.2 Deleting Tests

You may also delete **Tests**, but be careful since all parts of the **Assay Group** for the deleted test are also deleted. For example, if you have a sample, which has been dispensed for test TSH, and you delete TSH from the panel, the dispensed sample will also be deleted to maintain internal consistency.

## 5.7 Creating Multi-step Assays

You can create **Assay Groups** with several **Assay Steps** for complex pipetting sequences. For example, one step could add a pre-dilution of samples into a pre-dilution rack, and another could distribute these samples to reaction positions together with controls. You would define one **Test** for the pre-dilution and one **Test** for each assay in the second step. The first **Assay Step** would pipette samples (with a diluent) for the pre-dilution **Test** to the pre-dilution rack. The *Sample Rack for Worksheet* would be the primary sample rack. The second step would be to pipette samples from the pre-dilution rack, so you would select the pre-dilution rack to be the *Sample Rack for Worksheet* for that step. The reaction positions would be marked for the required test. In operation, having created a worksheet, you would have to select every sample to be pre-diluted by clicking on the pre-dilution test column. Then you could select the tests for each sample from the panel and run the assay.

## 5.8 Editing the Mark5 Speeds

You can change the XYZ and syringe wash speeds for each **Assay Step** if necessary (generally the default settings are appropriate for wide application). To access the **Speed Editor**, select *Edit | Speeds* from the menu bar [show image]. The syringe wash speed is the speed at which wash fluid is dispensed into the wash trough between the samples. This may need to be adjusted for larger (2.5ml) syringe sizes.

The syringe sample speed can be defined for every **Sample Map** of every **Assay Step**, while the syringe dispense speed can be defined for every **Test** in every **Assay Step**.

## 5.9 Using the Notepad and Assay Step Delay

You can define a note for the **Worksheet** to display *before* an **Assay Step** is performed. To access the **Notepad Editor** select *Edit | Notepad* from the main menu [show image]

If you select **Pause With Note** and enter a time delay in hours and minutes, the Mark5 will pause for this amount of time before the **Assay Step** action resumes. The user can cancel this time delay before it has expired by pressing the <Cancel> button on the window [show image].

If you select **Pause With Note** and set the time delay for 0, the Mark5 will pause until the user presses the <OK> button. [show image]