*i*Solo®
Alpha/Beta Counting System

9237000E   V1.12

User's Manual

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Table of Contents

The *i*Solo® Alpha/Beta Counting System

1.   Introduction

A traditional approach for determining the activity of long-lived radionuclides present in air is based on sampling a measured volume of air through a filter, thus collecting radioactive dust particulate, and measuring the filter at a later time with an alpha spectrometer. The natural presence of Radon (^{222}Rn) and Thoron (^{220}Rn) gas in the atmosphere represents a significant problem when trying to rapidly quantify such an activity (e.g. without waiting for the Radon/Thoron signatures to decay). Alpha particles resulting from the decay of the daughters of the Radon/Thoron isotopes down scatter into the lower energy region of the spectrum where signals indicative of the presence of long-lived radionuclides would be detected. It is this interference that must be determined and corrected for. The Canberra *i*Solo® instrument utilizes a series of algorithms to evaluate the Radon/Thoron contributions to the spectrum to dramatically improve the signal to noise ratio of the long-lived alpha emitting radionuclides.

About this Manual

This manual contains the following chapters and appendices:

Chapter 1, *Introduction* (this chapter), is an introduction to the manual.

Chapter 2, *Quick Start*, gives a brief introduction to the *i*Solo front and rear panel controls.

Chapters 3 through 6 describe in detail how to use the Setup, Display, View, and Print menus.

The appendices offer useful information not usually needed in day-to-day operation.

2. Quick Start

The Quick Start chapter covers how to turn on the *i*Solo® as well as a brief overview of the front and rear panel controls, and how to use the sample slide.

Turning on the *i*Solo

The *i*Solo's power switch (1/0) controls power to the instrument. Power is enabled when the switch is in the "1" position and disabled when the switch is in the "0" position. The power switch is located on the right side. The Power LED glows when the instrument is powered.

Power ON Options

You can choose from three power on options upon initialization of the unit. To access the power on options, you must hold the CANCEL key and cycle power on. A System Initialization menu is displayed with the following choices:

```
1 Cancel

2 System Reset

3 System Master Clear
```

At this point the you must move the cursor to the desired selection (or leave it at the default) and press ENTER. Note that pressing the CANCEL key has no effect at this point. The only way to continue is to press ENTER after making a selection.

Cancel

This selection will allow the *i*Solo to boot up normally, without clearing any data or resetting any procedure definitions. This selection effectively cancels the system initialization process as if the CANCEL key was not pressed during power up.

System Reset

A confirmation screen will be presented allowing you a choice between executing the system reset or continuing the power on process with no system reset. This selection sets all calibration, procedure, user, report, and source definitions to their defaults. All previous user entered definitions will be lost. All calibration, sample, and quality control data will be cleared. This selection should be executed after all firmware downloads or in the event of a system failure. Amplifier gain, sample and guard detector parameters, and parameter unique IDs will be retained. A confirmation screen follows this selection.

System Master Clear

This selection clears or resets all of the items as described in the system reset, and the following parameters:

Detector gain is cleared requiring the detector auto gain procedure to be run before any data may be taken.

Sample and guard detector voltages are reset to 0 volts.

All system unique ID values are reset. Care should be taken after executing a System Master Clear on an *i*Solo used in conjunction with *i*Link™, since there may now be duplicate keys used to identify procedures, calibrations, data samples, etc. in *i*Link.

The date and time of day are reset to 12:00 am, January 1, 2000.

A confirmation screen follows this menu selection allowing you an opportunity to abort. The system will default to the System Master Clear reset without providing the System Initialization menu if the battery backed up RAM is corrupted or if the RAM battery has failed or is removed.

Demo/Troubleshooting Mode

The *i*Solo contains a statistically random pulser that can be used to test and train users on the system without the use of radioactive sources. The demo mode is entered by turning the main power switch off and then turning the power back on while holding the Count button down. The front panel display will indicate that the system is in Demo mode. When in this mode, all sample counts are generated by the pulser. Background, efficiency, and user procedures can all be run as though there were real samples in the system. The Demo mode is exited by turning the main power switch off and then back on.

Background Calibrations and Daily Background QC Checks

When in the demo mode and performing a Background Calibration or Daily Background QC Check, the pulser produces a spectrum with a statistical distribution similar to that of an actual background measurement.

α Efficiency Calibrations and α Daily Efficiency QC Checks

When in the demo mode and performing an α Efficiency Calibration or α Daily Efficiency QC Check, the pulser produces a spectrum with a statistical distribution similar to that of an actual ^{241}Am efficiency measurement and a counting rate of 35% of the decay-corrected rate of the selected calibration source.

β Efficiency Calibrations and β Daily Efficiency QC Checks

When in the demo mode and performing a β Efficiency Calibration or β Daily Efficiency QC Check, the pulser produces a spectrum with a statistical distribution similar to that of an actual $Sr/^{90}Y$ efficiency measurement and a counting rate of 25% of the decay-corrected rate of the selected calibration source.

User Procedure

When in the demo mode and performing a User Procedure measurement, the pulser produces a spectrum with the following statistical distributions and counting rates:

Procedure A

Procedure A produces a ^{235}U spectrum at a typical counting rate of 1000 cpm.

Procedure B

Procedure B produces a spectrum consisting of ^{235}U with a typical counting rate of 100 cpm mixed a Radon/Thoron background with a typical counting rate of 1000 cpm.

Procedure C

Procedure C produces a ^{210}Pu spectrum at a typical counting rate of 1000 cpm.

Procedure D

Procedure D produces a spectrum consisting of ^{210}Pu with a typical counting rate of 100 cpm mixed a Radon/Thoron background with a typical counting rate of 1000 cpm.

Procedure E

Procedure E produces a AmCm spectrum at a typical counting rate of 1000 cpm.

Procedure F

Procedure F produces a spectrum consisting of AmCm with a typical counting rate of 100 cpm mixed a Radon/Thoron background with a typical counting rate of 1000 cpm.

Procedure G

Procedure G produces a spectrum consisting of ^{235}U with a typical counting rate of 1000 cpm mixed a Radon/Thoron background with a typical counting rate of 1000 cpm.

Procedure H

Procedure H produces a spectrum consisting of ^{210}Pu with a typical counting rate of 1000 cpm mixed a Radon/Thoron background with a typical counting rate of 1000 cpm.

Procedure I

Procedure I produces a spectrum consisting of AmCm with a typical counting rate of 1000 cpm mixed a Radon/Thoron background with a typical counting rate of 1000 cpm.

Procedure J

Procedure J produces a Radon/Thoron background spectrum with a typical counting rate of 1000 cpm.

Front Panel Controls

The *i*Solo is completely controlled via front panel keys and a liquid crystal display (LCD). The keys are color-coded and logically grouped. Count data is displayed on the LCD. See Figure 1.
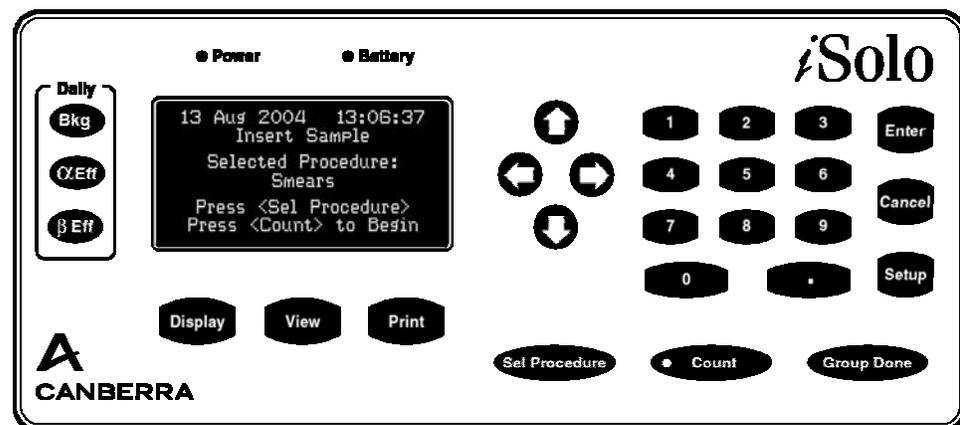
Figure 1 *i*Solo Front Panel and Display

When you first turn on the unit the *i*Solo's home screen is displayed:

```
      19Jan2005   09:50:32
         Insert Sample

      Selected Procedure:
          Procedure A



      Press <Sel Procedure>
               or
      Press <Count> to Begin
```

Power

Green LED – Indicates when the unit is connected to an external power supply and the power switch is on.

Yellow LED – Indicates the unit is powered by the charged battery.

Flashing Green/Yellow – Power Fault, this can be either in internal power supply problem or the memory/Real Time Clock backup battery needs to be replaced. The internal voltages measured are available on the "System Params" report.

Battery

The status of the battery is indicated by the Battery LED and an icon shown on the display.

Battery LED

Green – The batteries have sufficient charge to operate the unit.

Yellow – The batteries are near the end of their charge and the unit will shut-down in typically 10 to 15 minutes.

LCD Battery Indicator

The LCD Battery indicator shows the state of the charged battery from having a low charge to being fully charged as shown in Figure 2.
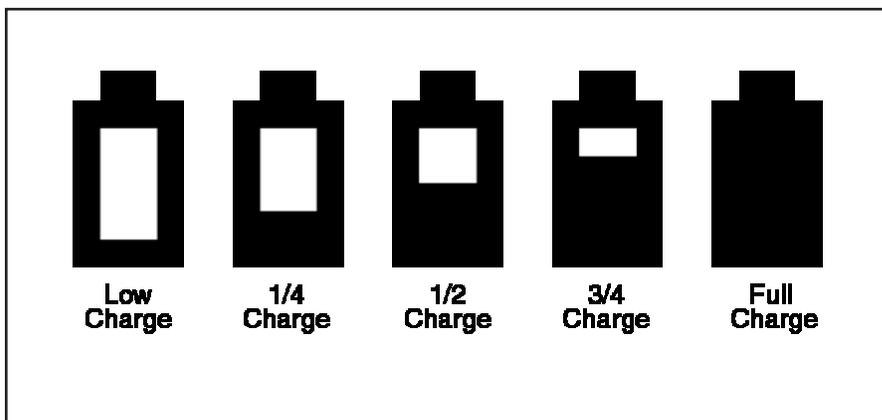
Figure 2 Battery Indicator

The batteries are not fully charged until the battery indicator stops flashing. Full charge takes about 12 hours and typical battery life is 12 hours. The batteries are al-ways being charged when the unit is powered from external power and the charge time is not dependant on whether or not the unit is operating.

If no batteries are present (the unit can be operated without batteries installed), then the LCD Battery Indicator will not be visible.

Display

The Display key is used to adjust the display contrast and viewing angle for the best visibility. The Display key is only active when the *i*Solo system is idle. See Chapter 4, *Display Menu*, for more details.

View

The View key is used to view the calibration and sample data. See Chapter 5, *View Menu*, for more details.

Print

From the Print key, the system provides several print functions. These allow you to print a report from the most recent group, all groups, select a specific group and report, and system and procedure reports. See Chapter 6, *Print Menu*, for more details.

Bkg, α Eff, and β Eff Keys

Pre-programmed hot keys linked to special count procedures to perform routine verifi-cation of background and efficiency.

Select Procedure Key

The Select Procedure key allows you to choose the desired counting procedure.

1. Press the **Sel Procedure** key.

2. Using the numeric keypad or the arrow keys, position the cursor ">" pointing to the desired procedure in the menu, and press the **Enter** key.

Count Key (Count/Pause/Resume)

The Count key automatically starts the *i*Solo counting based on the procedure shown in the display. The Count key also serves as a count/pause key. Once the sample is counting, pressing the **Count** key will pause the count. Press the **Count** key to resume the count without resetting the system.

Group Done Key

When counting several samples in the same data batch, the Group Done key is used to indicate the completion of the batch count.

1. When finished counting the batch of samples, press the **Group Done** key.

2. Confirm the **Group Done** by answering *YES/NO* to the prompt.

Arrow Keys

The arrow keys are located between the LCD display and the numeric keypad. The arrow keys provide a means to navigate through the menu system. These keys also allow selection of display information during a sample count and alphanumeric characters.

Selecting Alphanumeric Characters

During the operation of the *i*Solo, there are locations where alphanumeric characters can be entered. The procedure name, standard name, reports name, and activity units are some of the user definable information that may require special alphanumeric identification. Each field is initialized with factory default information that may be modified by you to customize the system to satisfy specific requirements.

Entering an Alphanumeric Name

1. When the text field is displayed, the cursor "_" will be located under the first character in the field.

2. Each character may be modified independently. To modify a particular character, press the **Right/Left** arrow keys to position the cursor under the character to modify.

3. Use the **Up/Down** arrow keys to scroll through the lower case and upper case alphabetical characters, special characters, and numerals. See Table 1.

4. When the desired character is located, release the arrow key.

5. Repeat this process for each character until the desired text has been displayed.

6. Press the **Enter** key to accept.

Table 1 Alphanumeric Characters		
A	a	-
B	b	/
C	c	α
D	d	δ
E	e	β
F	f	Σ
G	g	0
H	h	1
I	I	2
J	j	3
K	k	4
L	l	5
M	m	6
N	n	7
O	o	8
P	p	9
Q	q	
R	r	
S	s	
T	t	
U	u	
V	v	
W	w	
X	x	
Y	y	
Z	z	

Numeric Keypad

An 11-key numeric keypad is used to provide data entry.

Enter, Cancel, and Setup Keys

Special function keys to confirm data entry and to cancel an operation are provided. A special key that allows you to enter the System Setup is located on the front control panel.

Special key function

Enter   The **Enter** key allows you to confirm data entry. In Procedure definition, this key serves to enter the defined or new data and automatically advance to the next question. The Enter key is disabled during counting.

Cancel   The **Cancel** key has several different functions. During counting, the Cancel key stops counting. You can choose to delete or store data.

When used during system programming or data entry, the Cancel key allows you to return to the previous menu of a submenu.

Setup   The **Setup** key allows you to enter into the main system menu. The Setup menu provides access to many other functions including; editing count procedures, security, printer setup, data entry of calibration standards, and other functions.

Rear Panel Controls and Connectors

The rear panel of *i*Solo is shown in Figure 3. Located on the rear panel are connections for line power, parallel printer port, and RS-232 communications port.
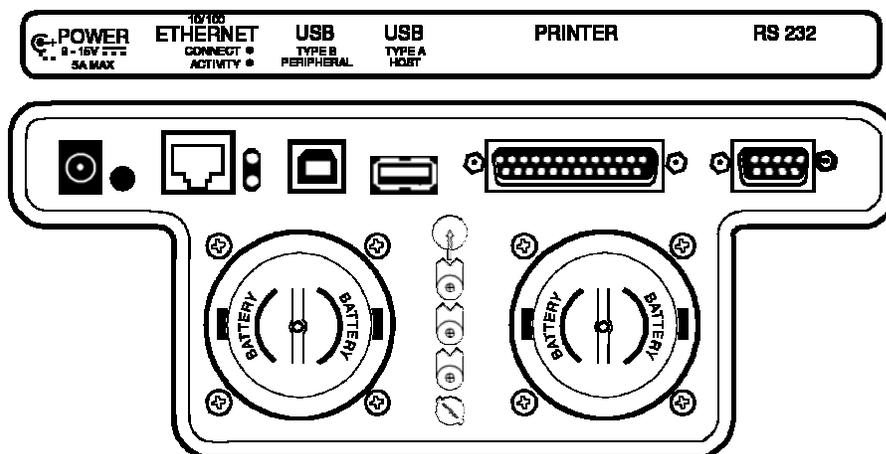
Figure 3 *i*Solo Rear Panel

The *i*Solo® Alpha/Beta Counting System

Printer

This connector is used to attach the *i*Solo to a printer. The standard printer recommended for use is the Oki® ML 320 Turbo.

RS-232

This connector is used to attach the *i*Solo to a computer or data logger for data transfer.

Batteries

Two battery holders contain three D-size NiMH batteries. Refer to Appendix E, *Technical Reference*, on how to install and care for the batteries.

Caution: Use of non-rechargeable batteries or rechargeable batteries other than those supplied or recommended by Canberra may cause an explosion or other fire hazard resulting in personal injury. Canberra is not liable for personal injury or damage resulting from the use of incompatible batteries.

Power

Power input of 9 to 15 V dc at 5 A maximum supplied by external universal power supply (included as part of the *i*Solo).

Ethernet

Future product enhancement.

USB Type B

This is the connection for the USB cable for use with *i*Link.

USB Type A

Future product enhancement.

Sample Slide

The *i*Solo system has a built-in sample slide (Figure 4). The slide is manually operated. To operate the slide simply use the attached handle to pull the counting drawer out to expose the sample holder. The *i*Solo comes with a calibration source holder, optional sample specific holders can be purchased separately.
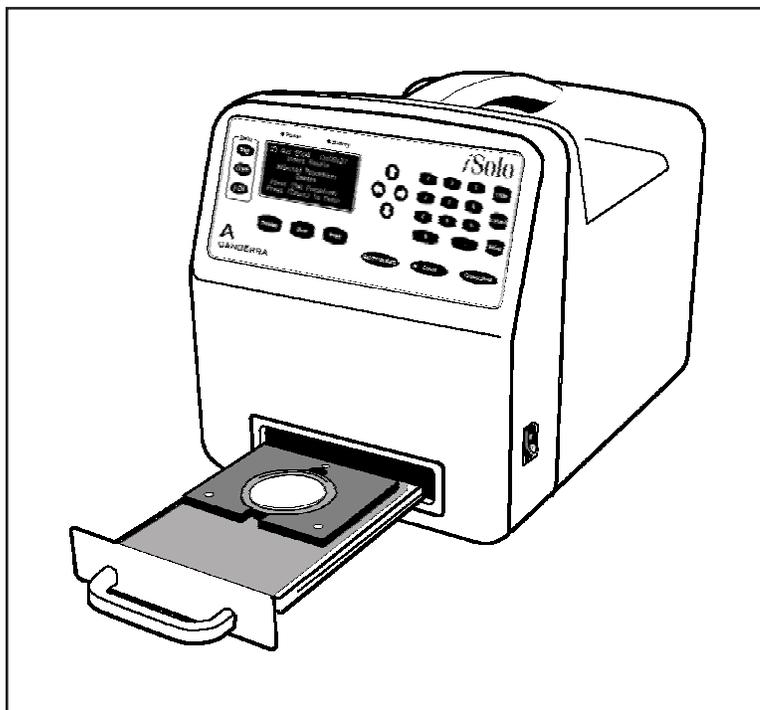
Figure 4 *i*Solo with Counting Drawing Open

An internal sensor is used to determine if the drawer is in the closed position for counting. During counting, if the sample slide is opened, both an audible alarm and a warning message are displayed.

Caution: All sample material must be contained below the top of the sample holder. Any material protruding above the top of the sample holder may result in severe damage to the detector window and possible internal detector contamination. Always use care to prevent sample material from being lost inside the sample slide.

Inserting the Sample Holder

To load the sample holder:

1. Open the counting drawer.

2. Align the holes in the sample holder with the post on the slide.

3. Press down firmly.

4. Close counting drawer.

Removing the Sample Holder

To remove the sample holder.

1. Open the counting drawer.

2. Position your fingers along the side of the sample slide.

3. Place your thumbs on either side of the slide and your fingers underneath the slide on the access holes. Gently push up on the sample holder. This will release the sample holder from the sample slide.

4. Close counting drawer.

3.   Setup Menu

The Setup menu provides logical access to most parameters and features of the *i*Solo® system. Menu choices can be selected two ways. Use the arrow keys to the right of the display to move the selection cursor ">" to desired the item or enter the number (1 through 16) of the desired item. Press the **Enter** key to make the selection. Press the **Cancel** key to back up one step in the menu tree.

There are sixteen choices on the first level menu:

```
1    Delete Data

2    Set Security Level

3    Define Procedure

4    System Information

5    Setup Printer

6    Define Report

7    Define Std Sources

8    Detector Parameters

9    Calibrations

10   Quality Control

11   Set Date/Time

12   Define Users

13   Clear QC Log

14   Data Output Setup

15   Set Analysis Parms

16   Setup Test Pulser
```

The main menu items have appropriate sub menus underneath. Each main menu choice is described in the following section. Press the **Setup** key to enter the main menu.

Delete Data

Sample data is stored in battery-backed memory in the *i*Solo. A total of 500 records are available to store data. Keep in mind that for each batch counted, an additional record is used for the "Group Done" indicator. In order to prevent sample data from being inadvertently over-written, if the device detects that the selected procedure's iteration will exceed the 500 record limit, the *i*Solo will halt operation and display an "Insufficient Memory" error message. The memory must be cleared before another sample can be counted.

```
1 Delete Data
      Confirm Deletion
      1 No, Cancel
>     2 Yes, Delete
```

The Delete Data menu option clears count data from internal memory by selecting Yes. To delete data:

1. Press the **Setup** key.

2. Delete Data is initially selected. Press the **Enter** key.

    If the system memory is empty, the screen will display a "NO MORE RECORDS" message. Press any key to return to the Setup menu.

3. Move the ">" cursor to the line "2 Yes, Delete" and press **Enter**.

Note: To avoid having insufficient memory to count a sample, the *i*Solo can be programmed to automatically print sample data and clear memory after the completion of each sample group. Refer to Data Output Setup on page 72 for more details.

Set Security Level

The *i*Solo allows a supervisor to control access to the system. With security *on* the supervisor can control who has permission to count samples, can require passkey-confirmed identification, and control system calibration and programming. The security system is disabled by default. When security is *on*, only items 1 and 2 of the Setup menu are available.

In addition to the supervisor, nine users can be defined. The supervisor has access to all operations of the system with security enabled. If security is turned on, the "Supervisor" should be set up first and then the other users should be set up. Please see "Define Users" on page 71 for instructions on how to enter user information.

Security Setup Menu	
1	Security OFF
2	Setup Only: Access to the Setup menu is limited to the Supervisor. Users can operate the system without selecting User Name or User Passkey.
3	Setup+User: Access to the Setup menu is limited to the Supervisor. User Name required for all other functions.
4	Setup+User+ID: Access to the Setup menu is limited to the Supervisor. User Name and User Passkey required for all other functions.
5	System Locked: Access limited to Supervisor. System is nonfunctional.

```
2 Set Security Level
     Enter Passkey
     Enter/Edit String:
     ---
       Security Level
     >  1 Security OFF
        2 Setup Only
        3 Setup+User
        4 Setup+User+ID
        5 System Locked
```

The Sets Security Level menu option sets the security level, and supervisor and user information for the *i*Solo. The default setting is with the Security level is *off*. The passkey is "   " (blank or space character). To enter the Supervisor ID:

1. Press the **Setup** key.

2. Move the ">" cursor to "2 Set Security Level" or enter the number 2 on the keypad and press **Enter**.

3. Enter default " " (blank) Passkey and press **Enter**.

4. Select "1 Security OFF" and press **Enter** to return to the Setup main menu.

5. Move the cursor to "12 Define Users" and press the **Enter** key.

6. Using the arrow keys, position the cursor ">" to "10 Supervisor" and press the **Enter** key.

If desired, the "Supervisor" User Name may be edited by using the up/down arrow keys or the numeric keypad to edit the letter and the left/right arrow keys to move to the next or previous letter. This ID may be up to 12 characters and/or numbers. Press **Enter** when finished. The "Enter Passkey" screen allows the Supervisor to enter any 7-character combination of alphanumeric text as a passkey. The Passkey is case sensitive. Note: It is recommended that, if at all possible, the Supervisor select a numeric passkey, as this will be the most convenient to enter for system access. This is the passkey for the Supervisor. *Make a note of the Supervisor passkey and keep it in a safe place.*

Define Procedure

The *i*Solo system counts, analyzes, and reports the results for samples based on pre-defined procedures. All procedures are entered and modified from the Define Procedure menu. The system will guide you through the steps to set counting and analysis parameters, reporting modes and contents that make up a complete procedure. The top-level procedure setup menu is shown below:

```
3 Define Procedure
   Select Procedure
     > A Procedure A
         Define Procedure A
          > 1 Procedure Name
            2 Select Calibration
            3 Unk Sample Diameter
            4 Select Report
            5 Count Time
            6 Sample Iterations
            7 Count Presets
            8 Activity Units
            9 Action Limits
            10 Method Blank Enable
      B Procedure B
      C Procedure C
      D Procedure D
      E Procedure E
      F Procedure F
      G Procedure G
      H Procedure H
      I Procedure I
      J Procedure J
```

Ten user defined procedures, labeled A through J, can be created and stored in the *i*Solo. Each procedure is defined using front panel keys. The procedure controls how the *i*Solo counts a sample, analyzes the data, and reports the results.

Before starting to enter the procedure into the system you should identify the following parameters:

Parameter	Description
Procedure Name	Name the procedure so that it is identifiable to you.
Calibration Applied	The unique system calibration to be applied to this sample procedure.
User Sample Diameter	The system uses the sample diameter to geometrically correct the calibration efficiency.
Sample Report	The system report template to be used when printing the sample results.
Count Time	Counting time for each sample in minutes.
Sample Iterations	Number of times to count each sample.
Count Presets	Maximum number of Alpha or Beta counts to terminate data collection.
Action Limits	Levels to trigger Warning and Alarm limits for both Alpha and Beta.
Eff Calc	Use system alpha and beta efficiencies, or use manually entered values.
Activity Units	Calculate activity in dpm, Bq, µCi, nCi, pCi or user defined units.

Procedures are entered from the **Setup** menu, after pressing the **Setup** key on the front panel. Using the arrow keys, position the cursor ">" to "3 Define Procedure" and press the **Enter** key.

The display will show a list of procedures and procedure names. The left-hand letter indicates the procedure, A through J and is followed by the default procedure name. Procedure names can be changed from the default Procedure A, Procedure B, Procedure C, to descriptive names that have meaning to you. Procedure names can be up to 22 characters long. The initial display looks like this:

```
      >  A Procedure A
         B Procedure B
         C Procedure C
         D Procedure D
         E Procedure E
         F Procedure F
         G Procedure G
         H Procedure H
         I Procedure I
         J Procedure J
```

Move the ">" cursor to the procedure to be edited and press **Enter**.

If you are starting from the default settings the display will show:

```
   Define Procedure A
      >  1 Procedure Name
         2 Select Calibration
         3 Unk Sample Diameter
         4 Select Report
         5 Count Time
         6 Sample Iterations
         7 Count Presets
         8 Activity Units
         9 Action Limits
         10 Method Blank Enable
```

Move the ">" cursor to the procedure parameter you want to change and press the **Enter** key or, referring to the procedure parameter list above, enter the appropriate choice or value and press the Enter key when done.

Note: The procedure setup process will automatically step through each menu in turn. For example, if you start with "1 Procedure Name" and enter a name, you will automatically be stepped to "2 Select Calibration", and so on. This auto stepping feature makes it much easier and faster for you to enter procedures, and greatly reduces the chances of missing a required setting.

Each procedure is setup following the steps above and has a number of parameters that must be set before using the procedure.

Procedure Name

The Procedure Name menu item allows you to enter a user defined name for a given procedure. The Procedure Name can be up to 22 alphanumeric characters long. To select a procedure name:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "3" in the menu, Define Procedure, and press the **Enter** key.

3. Using the arrow keys, select the procedure, and press the **Enter** key.

4. Using the arrow keys position the cursor ">" to item "1", Procedure Name, and press the **Enter** key.

5. Modify the Procedure Name.

6. Press the **Enter** key to accept and automatically advance to the next question in the procedure definition. Press the **Cancel** key to return to the Define Procedure Menu. Pressing the **Cancel** key again will bring up a "Save Changes?" question. Select `1. No` if the change was an error or `2. Yes` to save the change(s) made.

Select Calibration

The Select Calibration menu item allows you to select the calibration (choose from ten) to be applied to this user procedure.

To select a calibration:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "3" in the menu, Define Procedure, and press the **Enter** key.

3. Using the arrow keys, select the procedure, and press the **Enter** key.

4. Using the arrow keys position the cursor ">" to item "2", Select Calibration, and press the **Enter** key.

5. Using the arrow keys, select the desired calibration and press the **Enter** key.

6. Press the **Enter** key to accept and automatically advance to the next parameter in the procedure. Press the **Cancel** key to return to the Define Procedure Menu. Pressing the **Cancel** key again will bring up a "Save Changes?" question. Select `1. No` if the change was an error or `2. Yes` to save the change(s) made.

Unk Sample Diameter

The Unknown Sample Diameter menu item allows you to enter the active diameter of a user sample from 3.0 to 105.0 millimeters. The default value is 50.00 millimeters.

To enter the active diameter of the user sample:

1. Press the **Setup** key.

2. Using the arrow keys position the cursor ">" to item "3" in the menu, Define Procedure, and press the **Enter** key.

3. Using the arrow keys, select the procedure, and press the **Enter** key.

4. Using the arrow keys, position the cursor ">" to item "3", Unk Sample Diameter, and press the **Enter** key.

5. Enter the active diameter of the user sample in millimeters.

6. Press the **Enter** key to accept and automatically advance to the next parameter in the procedure. Press the **Cancel** key to return to the Define Procedure Menu. Pressing the **Cancel** key again will bring up a "Save Changes?" question. Select `1. No` if the change was an error or `2. Yes` to save the change(s) made.

Select Report

The Select Report menu item allows you to select the report to be printed when samples are counted using a procedure. Ten reports are available. Report definition is explained in "Define Report" on page 35. Report selections are:

```
1   SAMPLE ACTIVITY            (pre-defined)
2   ALPHA COMPENSATED DATA     (pre-defined)
3   RAW DATA                   (pre-defined)
4   NCPM DATA                  (pre-defined)
5   User Report
6   User Report
7   User Report
```

```
 8  User Report
 9  User Report
10 User Report
```

To select the report format for a procedure:

1. Press the **Setup** key.

2. Using the arrow keys position the cursor ">" to item "3" in the menu, Define Procedure, and press the **Enter** key.

3. Using the arrow keys, select the procedure, and press the **Enter** key.

4. Using the arrow keys position the cursor ">" to item "4", Select Report, and press the **Enter** key.

5. Using the arrow keys, select the desired report and press the **Enter** key.

6. Press the **Enter** key to accept and automatically advance to the next parameter in the procedure. Press the **Cancel** key to return to the Define Procedure Menu. Pressing the **Cancel** key again will bring up a "Save Changes?" question. Select `1. No` if the change was an error or `2. Yes` to save the change(s) made.

Count Time

The Count Time menu item allows you to enter the time in minutes that a sample is counted from 0.01 to 9,999.99 minutes. The default value is 10.00 minutes.

To enter the Count Time:

1. Press the **Setup** key.

2. Using the arrow keys position the cursor ">" to item "3" in the menu, Define Procedure, and press the **Enter** key.

3. Using the arrow keys, select the procedure, and press the **Enter** key.

4. Using the arrow keys, position the cursor ">" to item "5", Count Time, and press the **Enter** key.

5. Enter the desired Count Time in minutes.

6. Press the **Enter** key to accept and automatically advance to the next parameter in the procedure. Press the **Cancel** key to return to the Define Procedure Menu. Pressing the **Cancel** key again will bring up a "Save Changes?" question. Select `1. No` if the change was an error or `2. Yes` to save the change(s) made.

Sample Iterations

The Sample Iterations menu item allows you to enter the number of times each sample is counted. An average count value for a sample is automatically calculated and printed if the sample iteration is set to a value greater than one. You can enter a value from 1 to 100; defaults to 1.

To enter the Sample Iterations:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "3" in the menu, Define Procedure, and press the **Enter** key.

3. Using the arrow keys, select the procedure, and press the **Enter** key.

4. Using the arrow keys, position the cursor ">" to item "6", Sample Iterations, and press the **Enter** key.

5. Enter the desired sample iteration.

6. Press the **Enter** key to accept and automatically advance to the next parameter in the procedure. Press the **Cancel** key to return to the Define Procedure Menu. Pressing the **Cancel** key again will bring up a "Save Changes?" question. Select `1. No` if the change was an error or `2. Yes` to save the change(s) made.

Count Presets

The Count Presets menu item allows you to enter the maximum number of Alpha or Beta counts to terminate data collection is set by the Count Presets parameters. You can enter a value from 1 - 99,999,999; defaults to 99,999,999.

To enter the Count Preset:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "3" in the menu, Define Procedure, and press the **Enter** key.

3. Using the arrow keys, select the procedure, and press the **Enter** key.

4. Using the arrow keys, position the cursor ">" to item "7", Count Presets, and press the **Enter** key.

5. Enter the maximum number of Alpha or Beta counts to terminate data collection.

6. Press the **Enter** key to accept and automatically advance to the next parameter in the procedure. Press the **Cancel** to return to the Define Procedure Menu. Pressing the Cancel key again will bring up a "Save Changes?" question. Select `1. No` if the change was an error or `2. Yes` to save the change(s) made.

Activity Units

The conversion factor converts sample alpha and beta counts into a desired unit of measure. This is often used for converting the sample counts to a unit of activity other than DPM. The resulting sample net activity will be multiplied by the selected factor.

The table below shows for each unit a description of that unit and its conversion factor. You can choose from a pre-defined unit or define your own.

	Unit	Description	Factor
1	dpm	Disintegration per minute	1.0
2	Bq	Becquerel	1.66E-02
3	µCi	micro Curie	4.5E-07
4	nCi	nano Curie	4.5E-04
5	pCi	pico Curie	0.45
6	K User Defined	User defined conversion factor	0.00 - 1.0E+18

To select the pre-defined Activity Unit:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "3" in the menu, Define Procedure, and press the **Enter** key.

3. Using the arrow keys, select the procedure, and press the **Enter** key.

4. Using the arrow keys, position the cursor ">" to item "8", Activity Units, and press the **Enter** key.

5. Using the arrow keys, position the cursor ">" to select the conversion factor and press the **Enter** key. A user-defined conversion factor can be entered.

6. Press the **Enter** key to accept and automatically advance to the next question in the procedure definition.

7. If only the Conversion Factor and/or Sigma are modified, pressing the **Cancel** key will return to the Define Procedure Menu. Pressing the **Cancel** key again will bring up a "Save Changes?" question. Select 1. No if the change was an error or 2. Yes to save the change(s) made.

If you choose to use user-defined conversion factor (K User Defined):

1. Select User Defined Unit.

2. Enter the custom conversion factor value from 0.00 to 1.00 x 10^{18}.

3. Enter the custom conversion factor sigma from 0.00 to 1.00 x 10^{18}.

4. Enter the custom conversion factor label up to 8 alphanumeric characters.

5. Press the Enter key to accept and automatically advance to the next question in the procedure definition.

6. If only the Conversion Factor and/or Sigma are modified, pressing the **Cancel** key will return to the Define Procedure Menu. Pressing the **Cancel** key again will bring up a "Save Changes?" question. Select 1. No if the change was an error or 2. Yes to save the change(s) made.

Action Limits

The Action Limits are user-defined levels that are compared to the sample counts at the completion of the measurement and are used to create a report action flag.

The *i*Solo allows four individual alpha and beta action limits to be independently set for each user procedure (Procedures A - J). Two additional lines in the report header area print the procedure action limit values.

The action limit values can also be printed on the report by selecting Alpha Limit or Beta Limit as a field that is defined in the report. The sample warning flags are printed in a Limit column as `*WARNING*` if the Warning level is exceeded and as `*ALARM*` if the Alarm Limit is exceeded.

Action Limits set the individual warning and alarm level limits for alpha and beta counts in the same units selected as the Conversion Factor. You can enter a value from 0.00 to 1.0×10^{18}.

To enter the Action Limits:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "3" in the menu, Define Procedure, and press the **Enter** key.

3. Using the arrow keys, select the procedure, and press the **Enter** key.

4. Using the arrow keys, position the cursor ">" to item "9", Action Limits, and press the **Enter** key.

5. Enter the desired Alpha Warning Limit and press the **Enter** key.

6. Enter the desired Alpha Alarm Limit and press the **Enter** key.

7. Enter the desired Beta Warning Limit and press the **Enter** key.

8. Enter the desired Beta Alarm Limit and press the **Enter** key.

9. Press the **Enter** key to accept and automatically advance to the next parameter in the procedure. Press the **Cancel** key to return to the Define Procedure Menu. Pressing the **Cancel** key again will bring up a "Save Changes?" question. Select `1. No` if the change was an error or `2. Yes` to save the change(s) made.

Method Blank Enable

User procedures may be defined to use a method blank for background determination.

To enter the method blank:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "3" in the menu, Define Procedure, and press the **Enter** key.

3. Using the arrow keys, select the procedure, and press the **Enter** key.

4. Using the arrow keys, position the cursor ">" to item "10", Method Blank Enable, and press the **Enter** key.

5. Select Method Blank mode desired, "OFF/Disable" or "ON/Enable" and press the **Enter** key to return to the Define Procedure menu.

When enabled, the first sample counted within the procedure is treated as the method blank. The counts stored are used as the background value for all subsequent unknown sample counts within that procedure. When COUNT is pressed the first time, you will be prompted as follows:

```
              Method Blank Enabled

          Insert Background Blank
             To Be Used For This
                Procedure Only

                Press Any Key
```

As soon as a key is pressed, *i*Solo will begin counting the sample. When counting stops, you are prompted to accept or reject the method blank background values. If rejected, the blank may be recounted. If accepted, the values stored for both alpha and beta counts per minute will be used as the background values in all subsequent calculations within that procedure. The activity calculations will still use the efficiencies stored in the calibration associated with the procedure. All printed reports for this procedure will reflect the use of the method blank. The method blank continues to provide background data for the procedure until GROUP DONE is pressed and accepted. The next time the procedure is run, the first sample will again be used as the method blank. This will continue until you disable the method blank through SETUP.

System Information

The system information menu is used to set system identification information.

```
4 System Information
  > 1 Unit ID
    2 Unit Serial Number
    3 Display All Unique IDs
    4 Display MAC Address
    5 View DAQ BD Paramters
    6 Version Information
```

Unit ID

The Unit ID menu item allows you to enter the instruments identification up to 22 alphanumeric characters. The default unit identification is *i*Solo.

To enter a Unit ID:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "4" in the menu, System Information, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "1", Unit ID, and press the **Enter** key.

4. Modify the Unit ID.

5. Press the **Enter** key to accept and automatically advance to the next item in the System Information list.

6. If you desire to only modify the Unit ID, pressing the **Cancel** key will return to the System Information Menu. Pressing **Cancel** a second time will return you to the Setup menu.

Unit Serial Number

The Unit Serial Number menu item allows you to enter the instrument serial number up to 22 alphanumeric characters.

To enter a Unit Serial Number:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "4" in the menu, System Information, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "2", Unit Serial Number, and press the **Enter** key.

4. Modify the Unit Serial Number.

5. Press the **Enter** key to accept and automatically advance to the next item in the System Information list.

6. If you desire to only modify the Unit Serial Number, pressing the **Cancel** key will return to the System Information Menu. Pressing **Cancel** a second time will return you to the Setup menu.

Display All Unique IDs

The Display All Unique IDs menu item allows you to view system unique identifications. This will default to the current identifications.

To display all unique IDs:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "4" in the menu, System Information, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "3", Display All Unique IDs, and press the **Enter** key.

4. The following *i*Solo system IDs are displayed for review. These IDs are intended for future releases of *i*Solo firmware and should not be cleared or altered in any way.

> User:
>
> Procedure:
>
> Calibrate:
>
> Source:
>
> Sample:
>
> Report:
>
> Smple Det:
>
> Guard Det:

5. These are read only fields. Pressing the **Enter** key will automatically advance to the next item in the Sytem Information list. Pressing **Cancel** will return to the System Information menu. Pressing **Cancel** a second time will return you to the Setup menu.

Display MAC Address

The Display MAC Address menu item allows you to view the system MAC (Media Access Controller) address. This will default to the controller board MAC address.

To display the MAC address:

Note: The MAC address is intended for future *i*Solo features.

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "4" in the menu, System Information, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "4", Display MAC Address, and press the **Enter** key.

4. The MAC address of the *i*Solo system controller board will be displayed.

5. These are read only fields. Pressing the **Enter** key will automatically advance to the next item in the Sytem Information list. Pressing **Cancel** will return to the System Information menu. Pressing **Cancel** a second time will return you to the Setup menu.

View DAQ BD Parameters

The View DAQ BD Parameters menu items allows you to view critical operating parameters.

To view DAQ board parameters:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "4" in the menu, System Information, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to item "5", View DAQ BD Parameters, and press the **Enter** key.

4. Three items are displayed on this screen:

DAQBD Temp: 30.55 °C (an example of DAQ board temperature)

Det Bias: 75.06 V (an example of actual detector bias)

Det Leakage: 3.45E-02 µA (an example of PIPS® radiation detector leakage current)

5. These are read only fields. Pressing the **Enter** key will automatically advance to the next item in the Sytem Information list. Pressing **Cancel** will return to the System Information menu. Pressing **Cancel** a second time will return you to the Setup menu.

Version Information

The Version Information menu item allows you to view the version and date of the firmware of the *i*Solo.

To display the version information:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "4" in the menu, System Information, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to item "6", Version Information, and press the **Enter** key.

4. This field is read only. Pressing the **Cancel** key will return to the System Information Menu. Pressing the **Enter** key or pressing the **Cancel** key a second time will return you to the Setup menu.

Setup Printer

The Setup Printer menu allows you to define page and print characteristic details specific to each printer. In addition, a timeout function is provided for the parallel printer port so that if an external device is not responding, the *i*Solo system will continue to count and store data.

The Setup Printer menu consists of the following functions.

Character/Line

The Chars/Line menu item allows you to set the number of characters per line used by the printer for printing reports. The number of fields available for a report depends on the number of characters available per line. Fields use 10 characters each. A setting of 90 characters per line allows nine fields. A setting of 106 characters per line allows ten fields. Adjust the printer's character pitch to match the Characters Per Line setup. You can enter from 1 to 160 characters, the default value is 90. To set the number of characters per line:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "5" in the menu, Setup Printer, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to item "1", Chars/Line, and press the **Enter** key.

4. Enter the number of characters per print line. Press the **Enter** key to accept and automatically advance to the next question in the Setup Printer definition.

5. If only the Chars/Line is modified, pressing the **Cancel** key will return to the Setup Printer Menu. Pressing **Cancel** a second time will return you to the Setup menu.

Left Margin

The Left Margin menu item allows you to set the number of characters from the left printer margin before printing starts. You can enter from zero to the number of characters per line (see previous section); default value is 0.

To set the Left Margin:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "5" in the menu, Setup Printer, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "2", Left Margin, and press the **Enter** key.

4. Enter the number of characters to define the left margin. Press the **Enter** key to accept and automatically advance to the next question in the Setup Printer definition.

5. If only the Left Margin is modified, pressing the **Cancel** key will return to the Setup Printer Menu. Pressing **Cancel** a second time will return you to the Setup menu.

Lines/Page

The Line/Page menu item allows you to set the total number of lines used per page of print. You can enter from 0 to 1000 (0 value sets continuous printout); default value is 66.

To set the total number of lines per page:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "5" in the menu, Setup Printer, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to item "3", Lines/Page, and press the **Enter** key.

4. Enter the lines per page. Press the **Enter** key to accept and automatically advance to the next question in the Setup Printer definition.

5. If only the Lines/Page is modified, pressing the **Cancel** key will return to the Setup Printer Menu. Pressing **Cancel** a second time will return you to the Setup menu.

Top Margin

The Top Margin menu item allows you to set the number of blank lines at top of report page before printing starts. You can enter from zero to the number of lines per page (see lines/page section); default value is 0.

To set the top margin:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "5" in the menu, Setup Printer, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to item "4", Top Margin, and press the **Enter** key.

4. Enter the number of characters to define the top margin. Press the **Enter** key to accept and automatically advance to the next question in the Setup Printer definition.

5. If only the Top Margin is modified, pressing the **Cancel** key will return to the Setup Printer Menu. Pressing **Cancel** a second time will return you to the Setup menu.

Bottom Margin

The Bottom Margin menu item allows you to set the number of blank lines left at the bottom of the report page. You can enter from zero to the number of lines per page (see previous section); default value is 2.

To set the bottom margin:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "5" in the menu, Setup Printer, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to item "5", Bottom Margin, and press the **Enter** key.

4. Enter the number of characters to define the bottom margin. Press the **Enter** key to accept and automatically advance to the next question in the Setup Printer definition.

5. If only the Bottom Margin is modified, pressing the **Cancel** key will return to the Setup Printer Menu. Pressing **Cancel** a second time will return you to the Setup menu.

LPT Timeout

The LPT Timeout menu item allows you to set the time the system waits for a printer response before indicating an error. You can enter from a value 0 to 30 seconds; default is 10 seconds.

To set the LPT Timeout:

1. Press the **Setup** key.

2. Using the arrow keys position the cursor ">" to item "5" in the menu, Setup Printer, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "6", LPT Timeout and press the **Enter** key.

4. Enter the time in seconds to define the LPT Timeout. Press the **Enter** key to accept and automatically return you to the Setup Printer Menu.

5. If only the LPT Timeout is modified, pressing the **Cancel** key will return to the Setup menu.

Define Report

The *i*Solo systems allows you to define custom reports with system and data fields of your own choosing. There are ten programmable reports available in the system. Four report formats are pre-defined, but may also be modified by the user.

A report can be from one to several fields wide. Report width depends on the Characters/Line parameter entered in the Printer Setup mode. Each data field is ten characters wide therefore a printer setting of 90 characters per line allows up to nine fields to be printed in a report. Using the Character/Line menu item to print a larger number of characters per line allows a report to have more fields per line.

After you have selected the report to define, the following sub menu items are available:

```
6 Define Reports
   Select Report
   >  1  SAMPLE ACTIVITY
         Define Report
         > 1 Edit Title
           2 Select Field
           3 Clear Last
           4 Print
           5 Group Summary
           6 Print Header
```

	Complete List of Report Field Selections	
Channel	**Attributes**	**Description**
Sample	Sample Num:Itr	Sample number (incremental in a batch) : sample iteration
	Sample ID	Alphanumeric Sample ID
	Date	Count date
	Start time	Time of day the sample was started
	End time	Time of day the sample was finished
Time	Time	Count time (minutes)
Alpha	Procedure Activity	Alpha activity is printed in the unit (dpm, Bq, μCi, nCi, pCi or user defined K) selected in the procedure used to perform the analysis.
	Gross Counts	Alpha gross counts, no background subtraction
	Net Counts	Alpha gross counts with background subtracted
	CPM	Alpha counts per minute, no background subtraction
	Net CPM	Apha counts per minute with background subtracted
	Activity $\pm$X Sigma	Total uncertainty associated with above alpha Procedure Activity, Gross Counts, Net Counts, CPM or Net CPM
	Decision Level	Report decision level for above alpha Procedure Activity, Gross Counts, Net Counts, CPM or Net CPM
	Limit	Action Limits, Warning and Alarm (defined in counting procedure). See "Action Limits" on page 25.
α**(3-6.4 MeV)**	Procedure Activity	Alpha activity for region from 3 to 6.4 MeV is printed in the unit (dpm, Bq, μCi, nCi, pCi or user defined K) selected in the procedure used to perform the analysis.
	Gross Counts	Alpha gross counts (3 to 6.4 MeV region), no background subtraction
	Net Counts	Alpha gross counts (3 to 6.4 MeV region) with background subtracted
	CPM	Alpha counts per minute (3 to 6.4 MeV region), no background subtraction
	Net CPM	Alpha counts per minute (3 to 6.4 MeV region) with background subtracted

		Complete List of Report Field Selections		
Channel	**Attributes**	**Description**
	Activity ±X Sigma	Total uncertainty associated with above alpha (3 to 6.4 MeV region) Procedure Activity, Gross Counts, Net Counts, CPM or Net CPM
	Decision Level	Report decision level for above alpha (3 to 6.4 MeV region) Procedure Activity, Gross Counts, Net Counts, CPM or Net CPM
α(3-5.6 MeV)	Procedure Activity	Alpha activity for region from 3 to 5.6 MeV is printed in the unit (dpm, Bq, μCi, nCi, pCi or user defined K) selected in the procedure used to perform the analysis.
	Gross Counts	Alpha gross counts (3 to 5.6 MeV region), no background subtraction
	Net Counts	Alpha gross counts (3 to 5.6 MeV region) with background subtracted
	CPM	Alpha counts per minute (3 to 5.6 MeV region), no background subtraction
	Net CPM	Alpha counts per minute (3 to 5.6 MeV region) with background subtracted
	Activity ±X Sigma	Total uncertainty associated with above alpha (3 to 5.6 MeV region) Procedure Activity, Gross Counts, Net Counts, CPM or Net CPM
	Decision Level	Report decision level for above alpha (3 to 5.6 MeV region) Procedure Activity, Gross Counts, Net Counts, CPM or Net CPM
α(3-5.0 MeV)	Procedure Activity	Alpha activity for region from 3 to 5.0 MeV is printed in the unit (dpm, Bq, μCi, nCi, pCi or user defined K) selected in the procedure used to perform the analysis.
	Gross Counts	Alpha gross counts (3 to 5.0 MeV region), no background subtraction
	Net Counts	Alpha gross counts (3 to 5.0 MeV region) with background subtracted
	CPM	Alpha counts per minute (3 to 5.0 MeV region), no background subtraction
	Net CPM	Alpha counts per minute (3 to 5.0 MeV region) with background subtracted

Complete List of Report Field Selections		
Channel	**Attributes**	**Description**
	Activity ±X Sigma	Total uncertainty associated with above alpha (3 to 5.0 MeV region) Procedure Activity, Gross Counts, Net Counts, CPM or Net CPM
	Decision Level	Report decision level for above alpha (3 to 5.0 MeV region) Procedure Activity, Gross Counts, Net Counts, CPM or Net CPM
Beta	Procedure Activity	Beta activity is printed in the unit (dpm, Bq, µCi, nCi, pCi or user defined K) selected in the procedure used to perform the analysis.
	Gross Counts	Beta gross counts, no background subtraction
	Net Counts	Beta gross counts with background subtracted
	CPM	Beta counts per minute, no background subtraction
	Net CPM	Beta counts per minute with background subtracted
	Activity ±X Sigma	Total uncertainty associated with above beta Procedure Activity, Gross Counts, Net Counts, CPM or Net CPM
	Decision Level	Report decision level for above beta Procedure Activity, Gross Counts, Net Counts, CPM or Net CPM
	Limit	Action Limits, Warning and Alarm (defined in counting procedure). See "Action Limits" on page 25.
Beta Comp	Procedure Activity	Radon compensated beta activity is printed in the unit (dpm, Bq, µCi, nCi, pCi or user defined K) selected in the procedure used to perform the analysis.
	Activity ±X Sigma	Total uncertainty associated with above Radon compensated beta Procedure Activity
	Decision Level	Report decision level for above Radon compensated beta Procedure Activity
	Limit	Action Limits, Warning and Alarm (defined in counting procedure). See "Action Limits" on page 25.
Radon Contribution	Procedure Activity	Radon background region activity is printed in the unit (dpm, Bq, µCi, nCi, pCi or user defined K) selected in the procedure used to perform the analysis.
	Gross Counts	Radon background region gross counts, no background subtraction

Complete List of Report Field Selections		
Channel	**Attributes**	**Description**
	CPM	Radon background region counts per minute, no background subtraction
	Activity ±X Sigma	Total uncertainty associated with above Radon background region Procedure Activity, Gross Counts, or CPM
	Decision Level	Report decision level for above Radon background region Procedure Activity, Gross Counts, or CPM
Thoron Contribution	Procedure Activity	Thoron background region activity is printed in the unit (dpm, Bq, μCi, nCi, pCi or user defined K) selected in the procedure used to perform the analysis.
	Gross Counts	Thoron background region gross counts, no background subtraction
	CPM	Thoron background region counts per minute, no background subtraction
	Activity ±X Sigma	Total uncertainty associated with above Thoron background region Procedure Activity, Gross Count, or CPM
	Decision Level	Report decision level for above Thoron background region Procedure Activity, Gross Counts, or CPM
Guard	Gross Counts	Gross counts from guard detector
	Gross Rate	Count rate (cpm) from guard detector

Edit Title

The Edit Title menu item allows you to edit the title printed at the top of a report. You can enter up to 22 alphanumeric characters.

To edit the report title:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "6" in the menu, Define Report, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired report to define or modify and press the **Enter** key.

4. Using the arrow keys, position the cursor ">" to item "1" in the menu, Edit Title, and press the **Enter** key.

5. Use the up/down arrow keys to select characters, and the right/left arrow keys to select the character position to create or edit the report title.

6. Press the **Enter** key to accept and return to the Define Report menu to make additional items selections.

7. Press the **Cancel** key to return to the Select Report menu.

Select Field

The Select Field menu item allows you to select the system and sample data field(s) that appears on a report. The table in the beginning of "Define Report" on page 35 provides a comprehensive list of all of the fields available for inclusion in a report. You should first select the field to be edited by following these directions.

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "6" in the menu, Define Report, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired report to define or modify and press the **Enter** key.

4. Using the arrow keys, position the cursor ">" to item "2" in the menu, Select Field, and press the **Enter** key.

5. Using the arrow keys position the cursor ">" to select the data field to define then press the **Enter** key. If the field has been previously defined, you may modify the existing data field by selecting another field in its place.

6. Select the desired field type [Sample, Time, Alpha, α(3–6.4MeV), α(3–5.6MeV), α(3–5.0MeV), Beta, Beta Comp, Radon Contribution, Thoron Contribution and Guard] from the menu and press the **Enter** key.

7. Using the arrow keys position the cursor ">" to select the desired data field attribute and press the **Enter** key.

8. If a field type other than Sample or Time was chosen, and the report contains more empty fields to be defined, selecting an attribute and pressing **Enter** will bring up a subsequent menu, Report Uncertainty. This is the total uncertainty associated with the selected field in the same units as the attribute. Selections include Off, 1 Sigma, 2 Sigma and 3 Sigma. Once a selection is made, press the **Enter** key to accept and advance to the next question.

9. If the report contains more empty fields to be defined, a Report Decision Level menu will appear. Decision level is 1.645 times sigma. Select "No" or "Yes" and press the **Enter** key to return to the Select Field menu.

10. Pressing the **Cancel** key will return to the Define Report Menu. Press the **Cancel** key again to return to the Select Report menu.

Clear Last

The Clear Last menu item allows you to delete the last field selection made to a report definition. You can do this by:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "6" in the menu, Define Report, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired report to define or modify and press the **Enter** key.

4. Using the arrow keys, position the cursor ">" to item "3", Clear Last, and press the **Enter** key.

5. The last field is removed from the report. Repeat this process to delete additional data fields.

6. Press the **Cancel** key to return to the Define Report Menu. Press the **Cancel** key again to return to the Select Report menu.

Print

The Print menu item is used for testing report formats.

To print a report:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "6" in the menu, Define Report, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired report to define or modify and press the **Enter** key.

4. Using the arrow keys position the cursor ">" to item "4", Print, and press the **Enter** key.

5. The report title and column headers are printed.

6. System returns to the Define Report Menu when printing completed.

7. Press the **Cancel** key to terminate printing. Press the **Cancel** key again to return to the Select Report menu.

Group Summary

The Group Summary menu item enables the printing of an overall group summary line at the end of the sample data on the selected report.

To select the Group Summary mode:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "6" in the menu, Define Report, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired report to define or modify and press the **Enter** key.

4. Using the arrow keys, position the cursor ">" to item "5", Group Summary, and press the **Enter** key.

5. The cursor ">" will identify the current selection.

6. Select Group Summary mode desired, "OFF/Disable" or "ON/Enable" and press the **Enter** key to return to the Define Report main menu.

7. Press the **Cancel** key to return to the Select Report menu.

Print Header

The Print Header menu item allows you to choose to enable or disable printing the re-port header. The title lines (the top three lines) will always be printed. The calibration and procedure counting information in the header may be suppressed using this menu option.

To enable/disable the report header:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "6" in the menu, Define Report, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired report to define or modify and press the **Enter** key.

4. Using the arrow keys, position the cursor ">" to item "6", Print Header, and press the **Enter** key.

5. The cursor ">" will identify the current selection.

6. Select Print Header mode desired, "OFF/Disable" or "ON/Enable" and press the **Enter** key to return to the Define Report main menu.

7. Press the **Cancel** key to return to the Select Report menu.

Define Std Sources

Twenty-six User Sources can be defined and stored in the *i*Solo memory for system calibration. The *i*Solo contains a built in isotope library of the eleven most likely isotopes you might choose for system calibration. Isotopes, not included on this list, may be manually entered. The system will decay correct the activity for each source for efficiency calculations.

When received, the *i*Solo will have three User Sources already entered; a BkgBlank (Background Blank), an ^{241}Am alpha standard (required for system gain calibration) and a ^{90}Sr beta standard. These are the sources used to calibrate this *i*Solo.

Select User Source

The Select User Source function allows you to edit or define any of the twenty-six available calibration sources stored by the *i*Solo. The labels and values entered in the standards library are used for reports and efficiency calculations.

Note: A BkgBlank, background blank, must be entered in order to perform background calibrations.

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "7" in the menu, Define Std Sources, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to select the desired User Source to edit and press the **Enter** key.

    Previously Defined Sources

    When editing a previously defined source, the next menu allows you to declare the source as Undefined, an Alpha Standard, Beta Standard, Gamma Standard or Background Blank. Selecting Undefined clears the previous definition completely. Using the arrow keys position the cursor ">" to select the desired source type and press the **Enter** key, bringing up the Edit Std Name screen.

    Original Blank Sources

    When editing a previously defined When editing an original blank source, the next menu allows you to select a standard template from a list of twelve, eleven isotopes and a background blank. Using the arrow keys position the cursor ">" to select the desired template (see table below) and press the **Enter** key, bringing up the Edit Std Name screen.

Radionuclide Template List	
1	BkgBlank
2	Po-210
3	Sr/Y-90
4	Am-241
5	Th-230
6	Cs-137
7	U-238
8	Tc-99
9	Pu-239
10	Pu-238
11	Cl-36
12	Co-60

4. To modify the standard name, use the up/down arrow keys to select characters, and the right/left arrow keys to select the character position. Press the **Enter** key to save the name and advance to the next question.

5. If only the name is modified, pressing the **Cancel** key will bring up a "Save Changes?" question. Select 1. No if the change was an error or 2. Yes to save the change(s) made.

Half-life (Days)

The Half-life (Days) menu item allows you to enter the decay half-life used for a source from 0.00 to 1.0E+18 (10 characters maximum). You can select from a pre-defined or user defined source.

To enter the Half-life:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "7" in the menu, Define Std Sources, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired source to edit, and press the **Enter** key.

4. Using the **Enter** key, advance to the half-life prompt.

5. Using the numeric keypad, enter the radionuclide half-life in days, using scientific notation as needed. The format is n.nnE+/-ee. Use the up/down arrow keys to select the digit, sign, or "E", and the right/left arrow keys to select the position. Press **Enter** to advance to the next question.

6. If only the radionuclide half-life is modified, pressing the **Cancel** key will bring up a "Save Changes?" question. Select 1. No if the change was an error or 2. Yes to save the change(s) made.

Calibration Date

The Calibration date menu item allows you to enter the calibration date for a source including the month, day, and year. Valid entries are from January 1, 1980 to December 31, 2079; default date is January 1, 1980.

Note: Dates and date processing are Year 2000 compliant.

Calibration Month

To enter the month of calibration:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "7" in the menu, Define Std Sources, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired source to edit, and press the **Enter** key.

4. Using the **Enter** key, advance to the Select Month prompt.

5. Using the arrow keys or the numeric keypad, enter the month of calibration (January through December). Press the **Enter** key to accept and advance to the next question.

6. If only the calibration month is modified, pressing the **Cancel** key will bring up a "Save Changes?" question. Select 1. No if the change was an error or 2. Yes to save the change(s) made.

Calibration Day

To enter the calibration day of the month:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "7" in the menu, Define Std Sources, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired source to edit, and press the **Enter** key.

4. Using the **Enter** key, advance to the Enter Day prompt.

5. Using the arrow keys or the numeric keypad, enter the calibration day of the month (1 through 31). Press the **Enter** key to accept and advance to the next question.

6. If only the calibration day is modified, pressing the **Cancel** key will bring up a "Save Changes?" question. Select 1. No if the change was an error or 2. Yes to save the change(s) made.

Calibration Year

To enter the calibration year:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "7" in the menu, Define Std Sources, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired source to edit, and press the **Enter** key.

4. Using the **Enter** key, advance to the Enter Year prompt.

5. Using the arrow keys or the numeric keypad, enter the calibration year (1980 through 2079). Press the **Enter** key to accept and advance to the next question.

6. If only the calibration year is modified, pressing the **Cancel** key will bring up a "Save Changes?" question. Select 1. No if the change was an error or 2. Yes to save the change(s) made.

Calibration Time

The Calibration Time menu item allows you to enter the calibration time for a source including hours, minutes, and seconds from 00:00:00 to 23:59:59. Default time is 00:00:00.

Calibration Hour

To enter the hour of calibration:

1. Press the Setup key.

2. Using the arrow keys, position the cursor ">" to item "7" in the menu, Define Std Sources, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired source to edit, and press the **Enter** key.

4. Using the **Enter** key, advance to the Enter Hour prompt.

5. Using the arrow keys or the numeric keypad, enter the hour of calibration (2:00 PM is 14). Press the **Enter** key to accept and advance to the next question.

6. If only the calibration hour is modified, pressing the **Cancel** key will bring up a "Save Changes?" question. Select 1. No if the change was an error or 2. Yes to save the change(s) made.

Calibration Minute

To enter the calibration minute value:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "7" in the menu, Define Std Sources, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired source to edit, and press the **Enter** key.

4. Using the **Enter** key, advance to the Enter Minute prompt.

5. Using the arrow keys or the numeric keypad, enter the calibration minute value. Press the **Enter** key to accept and advance to the next question.

6. If only the calibration minute is modified, pressing the **Cancel** key will bring up a "Save Changes?" question. Select `1. No` if the change was an error or `2. Yes` to save the change(s) made.

Calibration Second

To enter the calibration seconds value:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "7" in the menu, Define Std Sources, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired source to edit, and press the **Enter** key.

4. Using the **Enter** key, advance to the Enter Second prompt.

5. Using the arrow keys or the numeric keypad, enter the calibration seconds value. Press the **Enter** key to accept and advance to the next question.

6. If only the calibration second is modified, pressing the **Cancel** key will bring up a "Save Changes?" question. Select `1. No` if the change was an error or `2. Yes` to save the change(s) made.

Calibration Activity (DPM) & Uncertainty

This menu item allows you to define the activity and uncertainty for a calibrated source in units of DPM (disintegrations per minute). Valid calibration activity entries are from $0.0 - 1.0 \times 10^{18}$; default value is 0.0. Valid 1-sigma activity uncertainty entries are from $0.0 - 1.0 \times 10^{18}$; default value is 0.0.

To enter the calibration activity in units in DPM:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "7" in the menu, Define STD Sources, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired source to edit, and press the Enter key.

4. Using the **Enter** key, advance to the Cal Activity (DPM) prompt.

5. Using the numeric keypad, enter the radionuclide calibration activity in units of DPM. Scientific notation is accepted. Press the **Enter** key to accept and advance to the next question.

6. If only the calibration activity is modified, pressing the **Cancel** key will bring up a "Save Changes?" question. Select `1. No` if the change was an error or `2. Yes` to save the change(s) made.

7. If the uncertainty is to be entered, enter the 1-sigma uncertainty value in DPM. Scientific notation is accepted. Press **Enter** to accept and advance to the next question.

8. If only the uncertainty is modified, pressing the **Cancel** key will bring up a "Save Changes?" question. `Select 1. No` if the change was an error or `2. Yes` to save the change(s) made.

Cal Sample Diameter

The Cal Sample Diameter menu item allows you to defines the active diameter of the calibration source from 3 to 105 mm; default value is 50 millimeters.

The *i*Solo system has the ability to make efficiency corrections based on the active diameter of unknown samples. It is critical, therefore, to identify the diameter of the active surface of a calibration source to be used for *i*Solo calibrations.

To enter the diameter of a calibration source in millimeters:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "7" in the menu, Define STD Sources, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to select the desired source to edit, and press the **Enter** key.

4. Using the **Enter** key, advance to the Cal Sample Diameter prompt.

5. Enter the value in millimeters and press the **Enter** key to save. Pressing **Enter** or **Cancel** at the Cal Sample Diameter prompt will bring up a "Save Changes?" question. `Select 1. No` if the change was an error or `2. Yes` to save the change(s) made.

6. If only the sample diameter value is modified, pressing the **Cancel** key will bring up a "Save Changes?" question. Select `1. No` if the change was an error or `2. Yes` to save the change(s) made.

Detector Parameters

The detector parameters menu is provided to enter or edit sample detector and optional guard detector operational parameters.

Note: The detector high voltage and threshold values used to test this system will be set at the factory and should not require editing. Additionally, the sample detector gain will also be set at the factory.

```
8 Detector Parameters
 > 1 Guard Det HV
   2 Guard Det Threshold
   3 Guard Det Serial #
   4 Sample Det HV
   5 Sample Det Threshold
   6 Sample Det Serial #
   7 Sample Det Gain Proc
```

Guard Det HV

Guard Det HV menu item allows you to set the guard detector high voltage from 0 V to 1250 V. The unit will default to the last set value or 0 if no guard detector is installed.

Note: Changing the guard detector high voltage will invalidate all current system calibration procedures. This does not impact gain calibration.

To enter a guard detector high voltage:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "8" in the menu, Detector Parameters, and press the Enter key.

3. Using the arrow keys position the cursor ">" to item "1", Guard Det HV, and press the **Enter** key.

4. Enter the value for the guard detector high voltage. This value can be found on the system test document.

5. Press the **Enter** key to accept. If the value has been changed, a warning message will be displayed:

```
WARNING!
Adjustment will clear all stored calibrations.
Press Enter to continue.
```

Pressing **Enter** will invalidate all current system calibration procedures. It will also automatically advance to the next question. Pressing **Cancel** to the warning will return to the Detector Parameters menu.

6. If you desire to only modify the Guard Det HV, pressing the **Cancel** key will return to the Detector Parameters Menu.

Guard Det Threshold

Guard Det Threshold menu item allows you to set the guard detector threshold from 0 to 100% of full scale value. The unit will default to the last set value or 100 if no guard detector is installed.

Note: Changing the guard detector threshold will invalidate all current system calibration procedures. This does not impact gain calibration.

To enter a guard detector threshold:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "8" in the menu, Detector Parameters, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "2", Guard Det Threshold, and press the **Enter** key.

4. Enter the guard detector threshold. Note: *10% of full Scale is recommended.*

5. Press the **Enter** key to accept. If the value has been changed, a warning message will be displayed:

```
WARNING!
Adjustment will clear all stored calibrations.
Press Enter to continue.
```

Pressing **Enter** will invalidate all current system calibration procedures. It will also automatically advance to the next question. Pressing **Cancel** to the warning will return to the Detector Parameters menu.

6. If you desire to only modify the Guard Det Threshold, pressing the **Cancel** key will return to the Detector Parameters Menu.

Guard Det Serial Number

Guard Det Serial Number menu item allows you to enter the guard detector's serial number.

To enter a guard detector serial number:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "8" in the menu, Detector Parameters, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "3", Guard Det Serial #, and press the **Enter** key.

4. Enter the serial number.

5. Press the **Enter** key to accept and automatically advance to the next question in the Detector Parameters definition.

6. If you desire to only modify the Guard Det Serial number, pressing the **Cancel** key will return to the Detector Parameters Menu.

Sample Det HV

The Sample Det HV menu item allows you to set the sample detector high voltage from 0 V to 150 V. The unit will default to the last entered value.

Note: Changing the sample detector high voltage will cause the system to require a complete calibration, starting with the detector and electronics gain calibration.

To enter a sample detector high voltage:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "8" in the menu, Detector Parameters, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "4", Sample Det HV, and press the **Enter** key.

4. Enter the Sample Det HV.

5. Press the **Enter** key to accept. If the value has been changed, a warning message will be displayed:

```
WARNING! Adjustment will un-calibrate.
Press Enter to continue.
```

   Pressing **Enter** will require a gain calibration be executed before any other type of count is performed. It will also automatically advance to the next question. Pressing **Cancel** to the warning will return to the Detector Parameters menu.

6. If you desire to only modify the Sample Det HV, pressing the **Cancel** key will return to the Detector Parameters Menu.

Sample Det Threshold

The Sample Det Threshold menu item allows you to set the sample detector threshold from 0 keV to 250 keV; defaults to the last value entered.

Note: Changing the sample detector threshold will invalidate all current system calibration procedures. This does not impact gain calibration.

To enter a Sample Det Threshold:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "8" in the menu, Detector Parameters, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "5", Sample Det Threshold, and press the **Enter** key.

4. Enter the Sample Det Threshold. Note:*125 keV* recommended for operation in environments of varying temperatures.

5. Press the **Enter** key to accept. If the value has been changed, a warning message will be displayed:

    ```
    WARNING!
    Adjustment will clear all stored calibrations.
    Press Enter to continue.
    ```

    Pressing **Enter** will invalidate all current system calibration procedures. It will also automatically advance to the next question. Pressing **Cancel** to the warning will return to the Detector Parameters menu.

6. If you desire to only modify the Sample Det Threshold, pressing the **Cancel** key will return to the Detector Parameters Menu.

Sample Det Serial Number

Sample Det Serial Number menu item allows you to enter the sample detector's serial number.

To enter a guard detector serial number:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "8" in the menu, Detector Parameters, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "6", Sample Det Serial #, and press the **Enter** key.

4. Enter the serial number.

5. Pressing the **Enter** key will automatically select the sample detector gain calibration procedure, and will return to the main display. The *i*Solo will display on screen:

    ```
    Insert Sample, Selected Procedure: Gain
    Calibration

    Press <Sel Procedure> or Press <Count> to Begin
    ```

    Refer to "Sample Det Gain Proc" on page 56.

Sample Det Gain Proc

The Sample Detector Gain Procedure menu item initiates an automated sample detector gain adjustment. The system uses a successive approximation technique for adjusting the sample detector channel amplifier gain to place the upper edge of the ^{241}Am peak into a specific reference channel.

Note: Canberra offers an ^{241}Am standard (Model AM50MM) that is specific to this automatic sample detector gain adjustment. If an alternate source is to be used, the face of that source must be precisely 4 mm from the face of the *i*Solo PIPS detector.

The sample detector high voltage and threshold must be set before performing the automated sample detector gain adjustment.

To initiate the sample detector gain procedure:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "8" in the menu, Detector Parameters, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "7", Sample Det Gain Proc, and press the **Enter** key.

4. The *i*Solo will display on screen:

    ```
    Insert Sample, Selected Procedure: Gain Calibration
    Press <Sel Procedure> or Press <Count> to begin.
    ```

    Press the **Count** button to begin this procedure.

5. Using the down arrow, select the ^{241}Am source to be used for this calibration and press the **Enter** button.

6. The *i*Solo will display: `Gain Calibration, Insert Am-241 Source`. Press **Enter** to continue. Place the correct ^{241}Am source in the *i*Solo sample holder provided for calibrations and press the **Enter** button to continue.

7. The *i*Solo will begin the automatic gain adjustment, displaying Time, decrementing from 0.5 minutes, Alpha counts, Beta counts, and Guard counts if the optional guard detector is installed. After each count the *i*Solo will briefly display the result of this measurement at the bottom of the LCD display as: `Pass X of 10, Gain Error = +/- X.XX %`.

8. When finished, the *i*Solo will display the message ... `SYS GAIN ADJUST COMPLETE, Gain Error = 0.00 %`. Press **Enter** to Accept or **Cancel** to Reject. You should press **Enter** and accept this gain adjustment.

Note: The *i*Solo will always be able to make a proper gain adjustment if the source is [241]Am and the source activity plane is 4 mm from the PIPS detector face. If an incorrect source was used or the source used was too far away from the detector, the *i*Solo will not be able to achieve a 0 % error and this procedure will need to be repeated.

Calibrations

Calibrations are performed by defining the procedures (background, alpha efficiency, and beta efficiency) for any of the 10 available system calibrations, and running those procedures. Each user procedure is associated with a system calibration and sample data acquired in a user procedure will use that calibration to calculate activity. Data records for all sample counts are maintained by *i*Solo until cleared by the user.

If an attempt is made to modify a calibration definition while data exists from a procedure that used that calibration, you will be prompted with the following screen:

```
Data Is Stored That Uses
      Calibration Name

Transfer or Delete Data
  Before Modifying This
        Calibration

     Press Any Key
```

You must delete those data records (using SETUP → Delete Data) or transfer them to *i*Link™ (which deletes data records from *i*Solo automatically) before the calibration may be modified. Reports and screen displays show results that are calculated "on the fly" from the raw data and the associated calibration. This requires that the calibration associated with a procedure must be intact in order to correctly review the results.

The Calibrations menu is used to define and execute system efficiency and background calibrations.

To access the Calibrations menu:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "9" in the menu, Calibrations, and press the **Enter** key.

3. Two selections are provided; Define Calibration and Execute Calibration.

At any time you can exit a screen by pressing the **Cancel** key.

Define Calibration

The Define Calibration menu item is used to define calibration procedures.

```
9 Calibrations
  1 Define Calibration
    Select Calibration
      > 1  Calibration 1
             Define Calibration 1
            > 1 Edit Cal Name
              2 Bkg Cal Parameters
              3 α Eff Cal Parameters
              4 β Eff Cal Parameters
        2  Calibration 2
        3  Calibration 3
        4  Calibration 4
        5  Calibration 5
        6  Calibration 6
        7  Calibration 7
        8  Calibration 8
        9  Calibration 9
        10 Calibration 10
```

Ten user calibrations, labeled 1 through 10, can be set up. Each calibration is defined through the front panel, and controls the *i*Solo calibration procedures. The *i*Solo will default to the first procedure.

Move the ">" cursor to the calibration procedure to be edited and press **Enter**.

Move the ">" cursor to the calibration parameter you want to change and press the **Enter** key.

Edit Cal Name

The Edit Cal Name menu item allows you to enter a name for a calibration procedure up to 22 alphanumeric characters.

To edit a calibration name:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "9" in the menu, Calibrations, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "1", Define Calibration, and press the **Enter** key.

4. Using the arrow keys, select the calibration, and press the **Enter** key.

5. Using the arrow keys position the cursor ">" to item "1", Edit Cal Name, and press the **Enter** key.

6. Modify the Calibration Name. Suggestion: Create a name that details the calibration procedure. For example: *50mm,10min* for a procedure that references 50 mm diameter sources and is used to count 50 mm diameter filters for 10 minutes.

7. Press the **Enter** key to accept and automatically advance to the next question in the calibration definition. Pressing the **Cancel** key after a change will return to the Define Calibration "X" screen.

8. If you desire to only modify the calibration name, pressing the **Cancel** key again will bring up a "Save Changes?" question. `Select 1. No` if the change was an error or `2. Yes` to save the change(s) made.

Bkg Cal Parameters

The Bkg Cal Parameters menu item allows you to define the background measurement procedure.

To edit the background measurement procedure:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "9" in the menu, Calibrations, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "1", Define Calibration, and press the **Enter** key.

4. Using the arrow keys, select the calibration, and press the **Enter** key.

5. Using the arrow keys position the cursor ">" to item "2", Bkg Cal Parameters, and press the **Enter** key.

6. Using the arrow keys position the cursor ">" to item "1", Count Time, and press the **Enter** key.

7. Enter the background measurement time in minutes. Default value is 30 minutes. Press the **Enter** key to accept and automatically advance to the next question in the Bkg Cal Parameters definition.

8. Enter the number of times the individual background measurement will be counted. Default value is 15. Press the **Enter** key to accept and automatically advance to the next question in the Bkg Cal Parameters definition.

9. Select the Blank (BkgBlank) Standard. Press the **Enter** key to accept and automatically advance to the Calibration Parameters definition.

α **Eff Cal Parameters**

The α Eff Cal Parameters menu item allows you to define the α efficiency measurement procedure.

To edit the α efficiency measurement procedure:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "9" in the menu, Calibrations, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "1", Define Calibration, and press the **Enter** key.

4. Using the arrow keys, select the calibration, and press the **Enter** key.

5. Using the arrow keys position the cursor ">" to item "3", α Eff Cal Parameters, and press the **Enter** key.

6. Using the arrow keys position the cursor ">" to item "1", Count Time, and press the **Enter** key.

7. Enter the α efficiency measurement time in minutes. Default value is 1 minute. Press the **Enter** key to accept and automatically advance to the next question in the α Cal Parameters definition.

8. Enter the number of times the individual α efficiency measurement is to be counted. Default value is 10. Press the **Enter** key to accept and automatically advance to the next question in the α Cal Parameters definition.

9. Select the α efficiency source. Press the **Enter** key to accept and automatically advance to the next question in the Calibration Parameters definition.

β **Eff Cal Parameters**

The β Eff Cal Parameters menu item allows you to define the β efficiency measurement procedure.

To edit the β efficiency measurement procedure:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "9" in the menu, Calibrations, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "1", Define Calibration, and press the **Enter** key.

4. Using the arrow keys, select the calibration, and press the **Enter** key.

5. Using the arrow keys position the cursor ">" to item "4", β Eff Cal Parameters, and press the **Enter** key.

6. Using the arrow keys position the cursor ">" to item "1", Count Time, and press the **Enter** key.

7. Enter the β efficiency measurement time in minutes. Default value is 1 minute. Press the **Enter** key to accept and automatically advance to the next question in the β Cal Parameters definition.

8. Enter the number of times the individual β efficiency measurement is to be counted. Default value is 10. Press the **Enter** key to accept and automatically advance to the next question in the β Cal Parameters definition.

9. Select the β efficiency source. Press the **Enter** key to accept and return you to the Define Calibration "X" screen.

Execute Calibration

Selecting the Execute Calibration menu item will start a calibration procedure.

```
9 Calibrations
  2 Execute Procedure
    Select Calibration
      >  1 Calibration 1
            Execute Calibration 1
            >  1 Background
               2 α Efficiency
               3 β Efficiency
         2  Calibration 2
         3  Calibration 3
         4  Calibration 4
         5  Calibration 5
         6  Calibration 6
         7  Calibration 7
         8  Calibration 8
         9  Calibration 9
        10  Calibration 10
```

1. Move the ">" cursor to the procedure to be executed and press **Enter**.

2. Follow the on screen directions to execute the selected calibration procedure.

Quality Control

The Quality Control menu is used to define and execute the QC procedures.

To access the Quality Control menu:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "10" in the menu, Quality Control, and press the **Enter** key.

3. Two selections are provided; Define QC Procedure and Execute QC Procedure.

At any time you can exit a screen by pressing the **Cancel** key.

Define QC Procedure

The Define QC Procedure menu is used to define the QC procedure.

```
10 Quality Control
   QC Sequences
      1  Define QC Procedure
       > 1 Select QC Reference
         2 Daily Bkg Params
         3 Daily α Eff Params
         4 Daily β Eff Params
```

Select QC Reference

The Select QC Reference menu item allows you to select the Calibration (see page 57) used as the reference for the QC procedure.

To select the QC reference:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "10" in the menu, Quality Control, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "1", Define QC Procedure, and press the **Enter** key.

4. Using the arrow keys position the cursor ">" to item "1", Select QC Reference, and press the **Enter** key.

5. Using the arrow keys, select the calibration to be used as the QC reference, and press the **Enter** key.

Daily Bkg Parameters

The Daily Bkg Parameters menu allows you to define the daily background measurement procedure.

To edit the daily background measurement procedure:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "10" in the menu, Quality Control, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "1", Define QC Procedure, and press the **Enter** key.

4. Using the arrow keys position the cursor ">" to item "2", Daily Bkg Params, and press the **Enter** key.

5. Using the arrow keys position the cursor ">" to item "1", Count Time, and press the **Enter** key.

6. Enter the daily background measurement time in minutes. Default value is 30 minutes. Press the **Enter** key to accept and automatically advance to the next question in the Define QC Procedure definition.

7. Enter the number of times the individual daily background measurement is to be counted. Default value is 1. Press the **Enter** key to accept and automatically advance to the next question in the Define QC Procedure definition.

8. Select the daily background warning level. Default value is 0 (off). Press the **Enter** key to accept and automatically advance to the next question in the Define QC Procedure definition.

9. Select the daily background lockout level. Default value is 0 (off). Press the **Enter** key to accept and automatically advance to the next question in the Define QC Procedure definition.

Daily α Eff Parameters

The Daily α Eff Parameters menu allows you to define the daily α efficiency measurement procedure.

To edit the daily α efficiency measurement procedure:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "10" in the menu, Quality Control, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "1", Define QC Procedure and press the **Enter** key.

4. Using the arrow keys position the cursor ">" to item "3", Daily α Eff Params, and press the **Enter** key.

5. Using the arrow keys position the cursor ">" to item "1", Count Time, and press the **Enter** key.

6. Enter the daily α efficiency measurement time in minutes. Default value is 10 minutes. Press the **Enter** key to accept and automatically advance to the next question in the Define QC Procedure definition.

7. Enter the number of times the individual daily α efficiency measurement is to be counted. Default value is 1. Press the **Enter** key to accept and automatically advance to the next question in the Define QC Procedure definition.

8. Select the daily α efficiency warning level. Default value is 0 (off). Press the **Enter** key to accept and automatically advance to the next question in the Define QC Procedure definition.

9. Select the daily α efficiency lockout level. Default value is 0 (off). Press the **Enter** key to accept and automatically advance to the next question in the Define QC Procedure definition.

Daily β Eff Parameters

The Daily β Eff Parameters menu item allows you to define the daily β efficiency measurement procedure.

To edit the daily β efficiency measurement procedure:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "10" in the menu, Quality Control, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "1", Define QC Procedure, and press the **Enter** key.

4. Using the arrow keys position the cursor ">" to item "4", Daily β Eff Params, and press the **Enter** key.

5. Using the arrow keys position the cursor ">" to item "1", Count Time, and press the **Enter** key.

6. Enter the daily β efficiency measurement time in minutes. Default value is 10 minutes. Press the **Enter** key to accept and automatically advance to the next question in the Define QC Procedure definition.

7. Enter the number of times the individual daily β efficiency measurement is to be counted. Default value is 1. Press the **Enter** key to accept and automatically advance to the next question in the Define QC Procedure definition.

8. Select the daily β efficiency warning level. Default value is 0 (off). Press the **Enter** key to accept and automatically advance to the next question in the Define QC Procedure definition.

9. Select the daily β efficiency lockout level. Default value is 0 (off). Press the **Enter** key to accept and automatically return to the Define QC Procedure menu. Pressing the **Cancel** key again will bring up a "Save Changes?" question. Select 1. No if the change was an error or 2. Yes to save the change(s) made.

Execute QC Procedure

The Execute QC Procedure menu is used to execute the QC procedure.

```
10 Quality Control
   QC Sequences
      2  Execute QC Procedure
        > 1 Daily α Efficiency
          2 Daily β Efficiency
          3 Daily Background
```

Daily α Efficiency

The Daily α Efficiency menu item initiates the daily a efficiency measurement.

To initiate the Daily α Efficiency:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "10" in the menu, Quality Control, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "2", Execute QC Procedure, and press the **Enter** key.

4. Using the arrow keys position the cursor ">" to item "1", Daily α Efficiency, and press the **Enter** key.

5. Follow the on screen directions for the daily α efficiency measurement.

Daily β Efficiency

The Daily β Efficiency menu item initiates the daily β efficiency measurement.

To initiate the Daily β Efficiency:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "10" in the menu, Quality Control, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "2", Execute QC Procedure, and press the **Enter** key.

4. Using the arrow keys position the cursor ">" to item "2", Daily β Efficiency, and press the **Enter** key.

5. Follow the on screen directions for the daily β efficiency measurement.

Daily Background

The Daily Background menu item initiates the daily background measurement.

To initiate the Daily Background:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "10" in the menu, Quality Control, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "2", Execute QC Procedure, and press the **Enter** key.

4. Using the arrow keys position the cursor ">" to item "3", Daily Background, and press the **Enter** key.

5. Follow the on screen directions for the daily background measurement.

Set Date/Time

The Set Date/Time menu allows you to set the system internal clock. The date and time are printed in fields in the headers of all calibration and data reports. The Set Date/Time menu item allows you to set the internal calendar and clock to the correct date and time including the month, day, year, hours, minutes, and seconds. Valid entries for the calendar are from January 1, 1980 to December 31, 2079; default date is January 1, 1980. Valid entries for the clock are from 00:00:00 to 23:59:59.

Set Day (of Week)

To enter the Day of the Week:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "11" in the menu, Set Date/Time, and press the **Enter** key.

3. The Select Day of Week menu is displayed. Using the arrow keys, position the cursor ">" to select the current Day of the Week, and press the **Enter** key. Pressing the **Enter** key will automatically advance to the next question.

4. If only the Day of the Week is modified, pressing the **Cancel** key will return to the Setup Menu.

Set Month

To enter the Month:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "11" in the menu, Set Date/Time, and press the **Enter** key.

3. Using the **Enter** key, advance to the Select Month prompt.

4. Select the current Month from the menu displayed. Using the arrow keys position the cursor ">" to select the current Month and press the **Enter** key. Pressing the **Enter** key will automatically advance to the next question.

5. If only the Month is modified, pressing the **Cancel** key will return to the Setup Menu.

Set Day (of Month)

To enter the Day of the Month:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "11" in the menu, Set Date/Time, and press the **Enter** key.

3. Using the **Enter** key, advance to the Enter Day 1..31 prompt.

4. Using the numerical keypad, enter the day of the month and press the **Enter** key. Pressing the **Enter** key will automatically advance to the next question.

5. If only the Day of the Month is modified, pressing the **Cancel** key will return to the Setup Menu.

Set Year

To enter the Year:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "11" in the menu, Set Date/Time, and press the **Enter** key.

3. Using the **Enter** key, advance to the Enter Yr 1980..2079 prompt.

4. Using the numerical keypad, enter the Year and press the **Enter** key. Pressing the **Enter** key will automatically advance to the next question.

5. If only the Year is modified, pressing the **Cancel** key will return to the Setup Menu.

Set Hour

To enter the Hour of the Day:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "11" in the menu, Set Date/Time, and press the **Enter** key.

3. Using the **Enter** key, advance to the Enter Hour 0..23 prompt.

4. The Enter Hour menu is displayed. Using the numeric keypad enter the current hour of the day and press the **Enter** key. Pressing the **Enter** key will automatically advance to the next question.

5. If only the Hour is modified, pressing the **Cancel** key will return to the Setup Menu.

Set Minute

To enter the Minute of the Hour:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "11" in the menu, Set Date/Time, and press the **Enter** key.

3. Using the **Enter** key, advance to the Enter Minute 0..59 prompt.

4. The Enter Minute menu is displayed. Using the numeric keypad enter the current minute of the hour and press the **Enter** key. Pressing the **Enter** key will automatically advance to the next question.

5. If only the Minute is modified, pressing the **Cancel** key will return to the Setup Menu.

Set Second

To enter the Second of the Hour:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "11" in the menu, Set Date/Time, and press the **Enter** key.

3. Using the **Enter** key, advance to the Enter Second 0..59 prompt.

4. The Enter Second menu is displayed. Using the numeric keypad enter the current second of the hour and press the **Enter** key to save and return to the Setup Menu.

Define Users

The Define Users menu allows you to add, delete, or edit user information for the supervisor and up to nine users.

Note: The *i*Solo Security system assumes that the Supervisor has already entered their passkey and further assumes that the Supervisor is entering this User information.

To define or edit user information:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "12" in the menu, Define Users, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to the left of the "User" of choice and press the **Enter** key.

4. The "User Name" may be entered or edited by using the up/down arrow keys or the numeric keypad to edit the letter and the left/right arrow keys to move to the next or previous letter. This ID may be up to 12 alphanumeric characters. Press **Enter** when finished.

5. The "Enter Passkey" screen allows the Supervisor to enter any 7-character combination of alphanumeric text as a passkey for this User. If the selected User Name/Passkey have not been previously edited, the Supervisor's Passkey will be displayed. The Supervisor's Passkey may be edited one character at a time or, if the keypad is used to enter any number for the first character, the passkey will clear except for the one entered number. Note: It is recommended that, if at all possible, the Supervisor select a numeric passkey for this User, as this will be the most convenient to enter for system access. The Passkey *is* case sensitive. This is the passkey for this User. Repeat this process to enter name and passkey information for other Users.

Clear QC Log

The Clear QC Log menu allows you to clear QC data from internal memory by selecting Yes; default is No.

The system maintains several quality control parameters. These parameters are determined by running daily check procedures. A ninety-point sliding-window is maintained for background, alpha efficiency and beta efficiency. The results of the last ninety measurements for each test can be printed in chart form, directly to a printer.

Note: A cleared QC Log is not recoverable.

1.   Press the **Setup** key.

2.   Using the arrow keys, position the cursor ">" to item "13" in the menu, Clear QC Log, and press the **Enter** key.

3.   Move the ">" cursor to the line "2 Yes" and press **Enter**.

4.   Pressing the **Cancel** key will return you to the Setup menu.

Data Output Setup

The Data Output Setup menu is used to program the output mode and the output con-figuration of the *i*Solo.

```
14 Data Output Setup
    1 Data Output Modes
      > 1 Manual
        2 Print Line by Line
        3 Print LBL/Delete
        4 Print End of Group
        5 Print EOG/Delete
        6 Print LBL/iLink/Delete
        7 Print EOG/iLink/Delete
        8 iLink/Delete
    2 Output Configuration
        1 USB iLink/DataDump Off
        2 USB iLink/DataDump On
        3 RS232 Only
    3 Printer Enable
        1 Off
        2 On
```

Output Modes

Eight types of output modes are available to select from:

1.   To select an Output Mode, press the **Setup** key.

2.   Using the arrow keys, position the cursor ">" to item "14" Data Output Setup and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to item "1" Data Output Modes and press the **Enter** key. Select the desired mode as described below:

Manual Printing - Report printing is manually initiated from the Print menu. The count data is *not* deleted from the unit's internal memory after printing.

Print Line by Line - The Report, as selected by the procedure, is automatically printed one line at a time after completion of each count record. The count data is *not* deleted from the unit's internal memory after printing.

Print Line by Line/Delete - The Report, as selected by the procedure, is automatically printed one line at a time after the completion of each count record. The count data is *automatically* deleted from the unit's internal memory after printing.

Print End of Group - The Report, as selected by the procedure, is automatically printed after the completion of the counting group. The count data is *not* deleted from the unit's internal memory after printing.

Print EOG/Delete - The Report, as selected by the procedure, is automatically printed after the completion of the counting group. The count data is *automatically* deleted from the unit's internal memory after printing.

Print LBL/iLink/Delete – The Report, as selected by the procedure, is automatically printed one line at a time after the completion of each count record. Data from the sample count is then transferred via *i*Link™ into a Microsoft SQL Server Database. The count data is automatically deleted from the unit's internal memory after printing and transfer.

Print EOG/iLink/Delete – The Report, as selected by the procedure, is automatically printed after the completion of the counting group. Data from the sample group count is then transferred via *i*Link into a Microsoft SQL Server Database. The count data is automatically deleted from the unit's internal memory after printing and transfer.

iLink/Delete – At the end of each count, data is transferred via *i*Link into a Microsoft SQL Server Database. The count data is automatically deleted from the unit's internal memory after transfer.

Output Configuration

By default, the interface to a host computer running *i*Link is USB. The RS-232 interface may be used independently to do a unidirectional data dump of count results after each count completes. The RS-232 data dump alone will *never* delete data. If the data dump is on, it will function in addition to any other output mode selected in the Output Mode Menu. As an alternative to USB, the RS-232 interface may be used to communicate with a host computer running *i*Link. In this case the *i*Solo USB interface is disabled and no RS-232 unidirectional data dump is available.

1. To access the Output Configuration Menu, press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "14" Data Output Setup and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to item "2" Output Configuration and press the **Enter** key. Select the desired configuration as described below:

    USB iLink/DataDump Off – Enables bi-directional communications for use with the optional *i*Link System Configuration and Data Capture PC software program via USB. The RS-232 data dump feature is disabled (default). Please refer to the *iLink Software User's Manual* for a full description of the capabilities of this software package.

    USB iLink/DataDump On – Enables bi-directional communications for use with the optional *i*Link System Configuration and Data Capture PC software program via USB. The RS-232 data dump feature is enabled. Please refer to the *iLink Software User's Manual* for a full description of the capabilities of this software package.

    RS232 iLink Only – The USB interface is disabled. Enables bi-directional communications for use with the optional *i*Link System Configuration and Data Capture PC software program via RS-232. Please refer to the *iLink Software User's Manual* for a full description of the capabilities of this software package.

Printer Enable

This menu item allows you to enable the printer if it has become disabled, either by user choice or in response to a printer error condition. If, while printing, a printer error occurs, you are given the choice of disabling the printer. If the printer is disabled in response to a printer error condition, then the data output mode will default to manual printing. You must reselect any other output mode that may have been in effect when the printer error occurred. Selection of a data output mode that uses the printer will not, by itself, enable a disabled printer.

Set Analysis Parms

The Set Analysis Parms menu is used to change a specific analysis parameter associated with sample analysis.

Note: Do not make any changes to any of these analysis parameters.

Forty eight parameters associated with the firmware of the *i*Solo are change-able using this Setup Menu item. Access to these items should only be attempted at the direct instruction of Canberra engineering staff members. If any item is opened and changed and "Yes" is responded when asked to "Save Changes", an "Enter Security Code" string must be entered correctly for changes to be saved. This requirement prevents accidental changes to the *i*Solo code from being made.

Setup Test Pulser

The Test Pulser menu item allows you to select the amplitude (pulse-height) of an internal test pulser for diagnostics purposes. The *i*Solo pulser generates pulses and injects these pulses at the input of the PIPS detector preamplifier. The amplitude can be set as a percentage of full scale. Full scale for the *i*Solo MCA is approximately 10 MeV. Any pulse with an amplitude less than 2.2 MeV is identified as a beta pulse and any pulse with an amplitude greater than 2.6 MeV is identified as an alpha pulse. Setting the pulser amplitude at 10% will generate pulses near the middle of the beta region of the MCA and setting the pulser amplitude at 60% will generate pulses near the middle of the alpha region of the MCA. Using these settings will allow the user to test the proper operation of the system electronics, should the need ever arise.

Pulser Amplitude

The Pulser Amplitude menu item allows you to enter the amplitude of the internal pulser from 0.0 to 100%; default value is 50%.

The pulser pulse height can be adjusted using these directions.

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "16" in the menu, Setup Test Pulser, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to item "1", Pulser Amplitude, and press the **Enter** key.

4. Enter the pulser value as a percent of full scale and press the **Enter** key. The Pulser On/Off screen appears.

5. Pressing the **Cancel** key will retain the original amplitude value and return to the Test Pulser Control menu. Pressing **Cancel** a second time will return you to the Setup menu.

Pulser On/Off

The Pulser On/Off menu item allows you to turn the internal pulser on or off. This is done by:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "16" in the menu, Setup Test Pulser, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to item "2", Pulser On/Off, and press the **Enter** key.

4. Enter the appropriate selection to turn the pulser On, "1" or Off, "2" and press the **Enter** key. This return to the Setup menu.

5. Pressing the **Cancel** key will return to the Test Pulser Control menu. Pressing **Cancel** a second time will return you to the Setup menu.

4. Display Menu

Depressing the front panel Display key displays a menu that allows you to set the display contrast and viewing angle for the best visibility. The Display key is only active when the *i*Solo® system is idle.

```
LCD ADJUST
   Angle: Up/Dn
   Backlight: Lt/Rt
```

To adjust the LCD:

1. With the system in the idle state, press the **Display** key.

2. Use the Up and Down arrow key to vary the viewing angle of the LCD display.

3. Use the Left and Right arrow keys to vary the intensity of the LCD display's backlight.

4. Press the **Cancel** key to exit.

5. View Menu

The function of the front panel View key depends upon the operational state of the *i*Solo® system. While the *i*Solo is idle, with no count results displayed, the View key allows sample count data or calibration values to be reviewed.

```
VIEW
    1 View Sample Data
        Memory Status 1 of 500 used
    2 View Calibration Data
        Select Calibration
         > 1 Calibration 1
             Calibration 1
                    Bkg(cpm)  Eff(%)
             α:   0.00      0.00
             β:   0.00      0.00
           2 Calibration 2
           3 Calibration 3
           4 Calibration 4
           5 Calibration 5
           6 Calibration 6
           7 Calibration 7
           8 Calibration 8
           9 Calibration 9
           10 Calibration 10
    3 View QC Data
```

Sample Data

The results of a completed count can be reviewed by pressing the **View** key and selecting View Sample Data. The Up arrow key selects the first count results in memory while the Down arrow key selects the last count result. The Left/Right arrow keys select either the previous or next count result for display. Once the desired data record is displayed, pressing the **Print** key causes the system to print a single-record report using the report template selected in the procedure under which the sample was counted. The print header for the procedure used to count the sample will be printed (if enabled - see "Print Header" on page 43) followed by the single record.

1. Press the **View** key.

2. Using the arrow keys, move the cursor ">" to item "1", View Sample Data.

The system briefly displays a count of the total number of data records stored, and the maximum capacity of the memory. For example:

```
                1 of 51

          500 records (max)
```

The system then automatically displays the first data record. Pressing the left or right arrow steps the display forward or backward through the stored data records.

When reviewing stored data, or while the *i*Solo is actively counting a sample or counting results are displayed at the completion of a measurement, depressing the View key selects the presentation of the count information. Each press of the View key advances the display to the next presentation format in a circular manner. Pressing the View key again will return the screen to the default display format showing the remaining time for an active count or the elapsed time for a completed count and the activity.

Activity Results

The default display shows time, α and β activity, and radon compensated activity when counting unknown samples.

```
      13Jul2005           07:19:46

      Procedure A           000:000

         T:                1.00 min

         α:                4.35 dpm

         β:               10.06 dpm


      --- Radon Compensated ---

         α:                4.35 dpm

         β:               10.06 dpm
```

Raw Counts

Pressing View once will toggle the data display to show time and raw counts.

```
      13Jul2005           07:19:46

      Procedure A           000:000

         T:                1.00 min

         α:                   5 cts

         β:                  13 cts

         G:                   0 cts
```

Raw Spectrum

Pressing **View** again toggles the screen to the raw data spectrum display. The spectral display shows 256 channels of raw counts with the full scale units at the top of the Y axis. While viewing the spectrum, the full scale mode and value may be changed using the up, down, left, and right arrow keys.

Using the left and right arrow keys, the full scale range may be toggled between Log, Manually Set Linear, and Auto Scaling Linear. When in Manually Set Linear full scale mode, the vertical full scale range may be toggled from 64 counts to 128M counts using the up and down arrows. The full scale range wraps around after the maximum or minimum scales are reached.

Compensated Spectrum

Pressing the **View** key a third time will show the radon compensated spectrum. This display is characterized by the X axis appearing in the middle of the Y axis allowing negative data to appear below the X axis. The left, right, up, and down arrows modify the full scales the same as in the Raw Spectrum mode.

Calibration Data

System calibration values can be reviewed by pressing the **View** key, selecting View Calibration Data and then selecting the desired calibration. The background and efficiency values for the selected calibration are displayed. Pressing the View key again will return the screen to the default display format showing remaining time for an active count.

1. Press the **View** key.

2. Using the arrow keys, move the cursor ">" to item "2", View Calibration Data.

3. Select the calibration to view.

The system will display the background and efficiencies for the selected calibration as shown:

```
            Calibration 1

            Bkg(cpm)    Eff(%)

    α:        0.00       41.53

    β:       28.00       47.02
```

Pressing the left and right arrow keys will step the display through all ten stored calibrations.

QC Data Display

QC data is now available for display from within the View key menu. To access, from the main screen press View. Select #3 `View QC Data`. All of the QC data selections are shown in a menu:

QC Reports

    1 α Efficiency QC

    2 β Efficiency QC

    3 α Background QC

    4 β Background QC

Select the QC parameter desired and press Enter. The system will display all QC data points currently stored in the instrument. The following column information is displayed for each data point:

View QC Data

Date   Data Description   Status

The date will reflect the date the data point was taken. The data description is dependent on the type of data displayed. The status tells whether the data point is within accepted limits or outside of the warning or lockout levels as defined by the QC procedure

6. Print Menu

The front panel Print key provides access to a print menu where all print functions of the *i*Solo® are available. In many cases a report will automatically be printed when a procedure is run. If an additional report must be printed without recounting samples, and the sample data is still stored in the *i*Solo, the report can be selected and printed from this menu.

The *i*Solo has on board, battery backed-up storage for 500 samples. Keep in mind that for each batch counted, an additional record is used for the "Group Done" indicator. In order to prevent sample data from being inadvertently over-written, if the device detects that the selected procedure's iteration will exceed the 500 record limit, the *i*Solo will halt operation and display an "Insufficient Memory" error message.

A total of 500 records are available to store data.

```
PRINT MENU
> 1 Most Recent Grp
  2 All Grps
  3 Select Grp/Rpt
  4 System Reports
```

Print Most Recent Group

The most recent group of samples counted will be printed using the report template selected in the counting procedure used to count this group of samples.

1. Press the **Print** key.

2. Move the ">" cursor to "1 Most Recent Grp" and press **Enter**.

```
PRINT MENU
>  1 Most Recent Grp
       Printing Report
           Press Cancel to
           Terminate
              PRINTER FAULT
                  1 Re-try
                  2 Cancel Print
                  3 Printer OFF
        Report Completed
             Press Cancel
   2 ALL Grps
   3 Select Grp/Rpt
   4 System Reports
```

Print All Groups

Every group of samples counted and stored in memory will be printed using the report template selected in the counting procedure used to count each group of samples.

1. Press the **Print** key.

2. Move the ">" cursor to "2 ALL Grps" and press **Enter**.

```
PRINT MENU
   1 Most Recent Grp
>  2 ALL Grps
       Printing Report
       Press Cancel to
       Terminate
           PRINTER FAULT
                1 Re-try
                2 Cancel Print
                3 Printer OFF
   3 Select Grp/Rpt
   4 System Reports
```

Print Selected Group/Report

This print menu item allows you to first select a procedure (sample analysis, calibration and QC) as an identifier of which groups of counted samples to select for printing. It then lets you select which record to print and which report template to use.

1. Press the **Print** key.

2. Move the ">" cursor to "3 Select Grp/Rpt" and press Enter.

```
PRINT MENU
   1 Most Recent Grp
   2 ALL Grps
>  3 Select Grp/Rpt
        Select Procedure
        >  A Procedure A
                Proc: Procedure A
                Recs: 10
                      17Jun1998
                      09:13:03
                Select Report
                      1 SAMPLE ACTIVITY
                      2 ALPHA COMPENSATED DATA
                      3 RAW DATA
                      4 NCPM DATA
                      .
                      .
                      10 User Report
                          Printing Report
                          Press Cancel to
                          Terminate
                              PRINTER FAULT
                                  1 Re-try
                                  2 Cancel Print
                                  3 Printer OFF
                              Report Completed
                              Press Cancel
           B Procedure B
           C Procedure C
           .
           .
           J Procedure J
           K Daily β Eff QC
```

```
             L Daily α Eff QC
             M Daily Bkg QC.
             N β Eff Calibration
             O α Eff Calibration
             P Bkg Calibration
      4 System Reports
```

Print System Reports

This print menu item allows you to print System reports. System reports include:

- System Parameters - A complete, printed listing of all system IDs, calibrations, QC levels, printer settings, calibration sources, users and report definitions.

- Procedure Parameters - A complete, printed listing of every counting, calibration and QC procedure.

- QC Reports - A printed report of alpha or beta, efficiency or background with a daily QC chart.

To print a system report:

1. Press the **Print** key.

2. Move the ">" cursor to "4 System Reports" and press **Enter**.

3. Select the desired report and press **Enter**.

```
PRINT MENU
    1 Most Recent Grp
    2 ALL Grps
    3 Select Grp/Rpt
>   4 System Reports
    > 1 System Params
           Printing Report
               Press Cancel to
               Terminate
                     PRINTER FAULT
                         1 Re-try
                         2 Cancel Print
                         3 Printer OFF
           Report Completed
```

```
                        Press Cancel
        2 Proc Params
                Printing Report
                        Press Cancel to
                        Terminate
                                PRINTER FAULT
                                        1 Re-try
                                        2 Cancel Print
                                        3 Printer OFF
                        Report Completed
                        Press Cancel
        3 QC Reports
                1 α Efficiency QC
                2 β Efficiency QC
                3 α Background QC
                4 β Background QC
                Printing Report
                        Press Cancel to
                        Terminate
                                PRINTER FAULT
                                        1 Re-try
                                        2 Cancel Print
                                        3 Printer OFF
                        Report Completed
                        Press Cancel
```

A. Calibrating the System

The *i*Solo® system, like any precision analytical instrument, must be calibrated in order to measure samples with accurate, precise, and reproducible results. The *i*Solo has features that make calibration easy to set up and repeat. With dedicated calibration procedures, the system can be set up quickly and calibration repeated easily with minimal impact on productivity. The *i*Solo allows you to establish up to 10 independent calibrations.

Calibrating the system requires that some instrument settings be established and the resulting performance measured. The first step in calibrating the system is to adjust the sample channel's amplifier gain to establish a known energy calibration. The *i*Solo features an automated gain adjustment procedure that uses a successive approximation technique to place the upper-energy edge of the prominent ^{241}Am calibration source at a specific reference channel of the internal Multi-Channel Analyzer. The system energy calibration is common to the 10 independent system efficiency and background calibrations.

Once the system gain calibration has been established, the system background performance and efficiency are then measured. The resultant background and efficiency values are unique to the selected calibration. Background and efficiency measurements must be repeated for each unique system calibration that is being established.

Although the system is calibrated as part of the manufacturing process, good laboratory practice dictates that the system should be re-calibrated using calibration sources appropriate for your procedures and samples.

Note: The sample detector settings and gain adjustment *do not* need to be redone. The detector used to test your system is also the detector shipped with your system, and these parameters do not change.

Prior to beginning system calibration, the calibration procedures used should be defined. In most cases the default settings can be used and will give optimum system performance.

In summary, a complete system calibration includes the following:

- Entering calibration source information.

- Selecting the output mode.

- Modifying, if necessary, calibration procedures.

- Measuring the alpha and beta backgrounds for each system calibration

- Measuring the alpha and beta efficiencies for each system calibration

For each step of the calibration appropriate parameters are entered from the menu choices. The menu will automatically move to the following step as you select the parameters required for each procedure.

Note: The default settings should be fine, at least to get started, for most users.

Entering Calibration Source Information

Note: A background blank, Americium alpha and Strontium beta standard, will already be defined when the unit is received. These are the calibration sources used to test the system at the factory.

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "7" in the menu, Define Std Sources, and press the key.

3. Using the arrow keys position the cursor ">" to select the desired standard source to edit and press the **Enter** key.

4. Using the arrow keys position the cursor ">" to select the desired standard source template and press the **Enter** key. If the standard has been previously defined, pressing the Enter key will prompt the user with the selected source type (alpha, beta, or background blank). Pre-defined standards will default to the appropriate type of emitter.

5. To modify the radionuclide name, use the up/down arrow keys to select characters, and the right/left arrow keys to select the character position. Press the **Enter** key to accept and advance to the next question.

6. Using the numeric keypad, enter the radionuclide half-life in days, using scientific notation as needed. The format is n.nnE+/-ee. Use the up/down arrow keys to select the digit, sign, or "E", and the right/left arrow keys to select the position. Press the **Enter** key to accept and advance to the next question.

7. Using the arrow keys or the numeric keypad, enter the month of calibration (January through December). Press the **Enter** key to accept and advance to the next question.

8. Using the arrow keys or the numeric keypad, enter the calibration day of the month (1 through 31). Press the **Enter** key to accept and advance to the next question.

9. Using the arrow keys or the numeric keypad, enter the calibration year (1980 through 2079). Press the **Enter** key to accept and advance to the next question.

10. Using the arrow keys or the numeric keypad, enter the hour of calibration. Press the **Enter** key to accept and advance to the next question.

11. Using the arrow keys or the numeric keypad, enter the calibration minutes value. Press the **Enter** key to accept and advance to the next question.

12. Using the arrow keys or the numeric keypad, enter the calibration seconds value. Press the **Enter** key to accept and advance to the next question.

13. Using the numeric keypad, enter the radionuclide calibration activity in units of DPM. Scientific notation is accepted. Press the **Enter** key to accept and advance to the next question.

14. Enter the 1-sigma activity uncertainty value and press the **Enter** key.

15. Repeat steps 1 - 14 for each calibration source or press the **Cancel** key to return to the Setup menu.

Selecting Output Mode

To select the output mode, perform the following steps:

1. From the top-level menu, (*i*Solo idle and date and time of day displayed at the top of the LCD) press the **Setup** key and select item 14, Data Output Setup, from the menu and press **Enter**.

2. Select "Data Output Modes" from the menu and press **Enter**.

3. Select "Print End Of Group" and press **Enter** to automatically return to the top-level menu.

Modifying Calibration Procedures

To modify a calibration procedure, perform the following steps:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "9" in the menu, Calibrations, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "1", Define Calibration and press the **Enter** key.

4. Using the arrow keys, select the calibration (1 through 10), and press the **Enter** key.

5. Using the arrow keys position the cursor ">" to item "1", Edit Cal Name, and press the **Enter** key.

6. Modify the Calibration Name. Press the **Enter** key to accept and automatically advance to the next question in the calibration definition.

7. Enter the background measurement time in minutes. Press the Enter key to accept and automatically advance to the next question in the calibration definition.

8. Enter the number of individual background measurements. Press the **Enter** key to accept and automatically advance to the next question in the calibration definition.

9. Select the background blank source. Press the **Enter** key to accept and automatically advance to the next question in the calibration definition.

10. Enter the α efficiency measurement time in minutes. Press the **Enter** key to accept and automatically advance to the next question in the calibration definition.

11. Enter the number of individual α efficiency measurements. Press the **Enter** key to accept and automatically advance to the next question in the calibration definition.

12. Select the α efficiency source. Press the **Enter** key to accept and automatically advance to the next question in the calibration definition.

13. Enter the β efficiency measurement time in minutes. Press the **Enter** key to accept and automatically advance to the next question in the calibration definition.

14. Enter the number of individual β efficiency measurements. Press the **Enter** key to accept and automatically advance to the next question in the calibration definition.

15. Select the β efficiency source. Press the **Enter** key to accept and automatically advance to the next question in the calibration definition.

16. Repeat steps 1 - 15 for each calibration or press the **Cancel** key to return to the Calibration menu.

Measuring Alpha and Beta Backgrounds

Note: Background calibrations should always be performed prior to efficiency calibrations as efficiency values are background corrected. Background however may be performed independent of efficiencies.

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "9" in the menu, Calibrations, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "2", Execute Procedure and press the **Enter** key.

4 The iSOLO will prompt the user to "Recalculate Efficiencies?". Choose 1) No if efficiencies will not be performed or 2) Yes (the default).

5. Using the arrow keys, select the calibration, and press the **Enter** key.

6. Using the arrow keys position the cursor ">" to item "1", Bkg Cal Parameters, and press the **Enter** key.

7. Place the background blank on the *i*Solo sample slide.

8. Close the sample slide and press the **Enter** key.

9. Press the **Count** key to begin the background measurement.

10. After the background calibration procedure has completed, press Enter to accept the results, open the sample slide and remove the background blank. The Execute Calibration screen reappears.

Measuring Alpha and Beta Efficiencies

To measuring the Alpha and Beta efficiencies, perform the following steps:

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "9" in the menu, Calibrations, and press the **Enter** key.

3. Using the arrow keys position the cursor ">" to item "2", Execute Procedure, and press the **Enter** key.

4. Using the arrow keys, select the calibration, and press the **Enter** key.

5. Using the arrow keys position the cursor ">" to item "2", α Cal Parameters, and press the **Enter** key.

6. Place the source on the *i*Solo sample slide.

7. Close the sample slide and press the **Enter** key.

8. Press the **Count** key to begin the α efficiency measurement.

9. After the calibration procedure has completed, press **Enter** to accept the results, open the sample slide and remove the source. The Execute Calibration screen reappears.

10. Repeat steps 1 - 9 for the β efficiency measurement.

11. When the β efficiency measurement is complete, press the **Enter** key to accept the results. A screen will display stating "Calibration X is complete, press any key".

Note: Background, α efficiency and β efficiency measurements must be performed for each independent calibration.

B. Counting Samples

The primary function of the *i*Solo® is to count user samples and provide accurate alpha and beta results that are Radon and Thoron corrected. In order to count samples accurately and correctly the system must be properly calibrated and procedures must be created that provide the sensitivity requirements of the sample to be analyzed. Please refer to the "Define Procedures" on page 17 and "Calibrations" on page 57 for detailed information.

If the *i*Solo is calibrated and a procedure has been created, samples may be counted by following these steps:

1. Place the first sample to be analyzed in the *i*Solo sample holder and close the slide.

2. Press **Sel Procedure** to list the procedures available for sample analysis and place the curser ">" beside the procedure of choice for this batch of samples.

3. Press **Enter** to select the procedure and press **Count** to start the analysis of the first sample.

4. The Count key green LED will blink when the first sample has finished counting. Press **Group Done** to terminate the Group or place the next sample in the sample holder, close the slide, and press **Count** again. Pressing the **Cancel** key after a count has completed will initiate a "Delete Group Data? 1 No, 2 Yes" screen. Select No to save the count data or Yes to delete the count data.

5. When all of the samples in a batch have been counted, press the **Group Done** key to declare this group of samples complete. A screen appears asking the user to confirm, "Declare Group Done, 1 No, 2 Yes".

6. If another sample needs to be counted as part of this same group, place the curser ">" by 1 No and press the **Enter** key. Place another sample in the sample holder and count it as part of this original group.

C. System QC Charts

The *i*Solo® includes a versatile QC Charting function that allows background and effi-ciency QC information to be tracked over time. The QC Chart features a 90-point moving-window that allows multiple-points-per-day to be included in the chart. The Printer Setup default is 90 characters per line to allow the time-of-day to be included for each measurement.

QC Chart Reference

One of the ten available calibrations is chosen as the reference for the efficiency QC charts. This allows either a normal system calibration or as a secondary reference es-tablished for a "QC check source" to be used as the reference for the efficiency QC charts. This feature allows the daily "QC check sources" to be different than the sys-tem calibration sources.

QC Warnings

The QC Warning feature allows the system to apply a simple test to the Daily Back-ground, Alpha Efficiency, and Beta Efficiency to flag results that should be reviewed by the supervisor. The QC Warning feature compares the daily measurement to the QC chart reference parameter. If the daily value exceeds the QC Warning $\pm$ X sigma limit but is less than the QC Lockout $\pm$ Y sigma limit, then

```
***** WARNING: Value exceeds ± X sigma limit *****
```

is printed on the report. The $\pm$ X sigma limit is programmable as X = 1, 2, 3, 4 or 5 and an OFF selection disables the feature.

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "10" in the menu, Quality Control, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to item "1" in the menu, Define QC Procedure, and press the **Enter** key.

4. Using the arrow keys, position the cursor ">" to item "2" in the menu, Daily Bkg Params, and press the **Enter** key.

5. Using the arrow keys, position the cursor ">" to item "3" in the menu, QC Warning Limit, and press the **Enter** key.

6. Using the arrow keys, position the cursor ">" to the desired QC Warning Sigma and press the **Enter** key.

7. Repeat steps 1 - 6 for the setting the warning level for the daily α efficiency and daily β efficiency.

QC Lockout

The QC Lockout feature allows the system to apply a simple test to the Daily Background, Alpha Efficiency, and Beta Efficiency to disable (lockout) the system if results exceed acceptance limits. The QC Lockout feature compares the daily measurement to the QC chart reference parameter. If the daily value exceeds the QC Lockout $\pm$ Y sigma limit, then

```
***** SYSTEM LOCKED: VALUE EXCEEDS ± Y SIGMA LIMIT *****
          *****      CONTACT SUPERVISOR     *****
```

is printed on the report and the system is disabled. The $\pm$ Y sigma limit is programmable as 1, 2, 3, 4 or 5 and an OFF selection disables the feature.

The supervisor entering the **Setup | Set Security** menu sequence resets the system lockout. The supervisor would then enter their password and reselect the desired security level. The QC Lockout feature is disabled if the system security level is set to OFF.

1. Press the **Setup** key.

2. Using the arrow keys, position the cursor ">" to item "10" in the menu, Quality Control, and press the **Enter** key.

3. Using the arrow keys, position the cursor ">" to item "1" in the menu, Define QC Procedure, and press the **Enter** key.

4. Using the arrow keys, position the cursor ">" to item "2" in the menu, Daily Bkg Params, and press the **Enter** key.

5. Using the arrow keys, position the cursor ">" to item "4" in the menu, QC Lockout Limit, and press the **Enter** key.

6. Using the arrow keys, position the cursor ">" to the desired QC Lockout Sigma and press the **Enter** key.

7. Repeat steps 1 - 6 for the setting the warning level for the daily α efficiency and daily β efficiency.

Executing a Daily QC Procedure

To execute a Daily QC procedure, perform the following:

1. Press the **Setup** key and select item 14, Data Output Setup, from the menu and press **Enter**.

2. Select "Data Output Modes" from the menu and press **Enter**.

3. Select "Print End Of Group" and press **Enter** to automatically return to the top-level menu.

4. From the top-level menu, with the *i*Solo idle, press Daily Bkg, Daily α Eff or Daily β Eff on the *i*Solo front panel, left of the LCD display.

5. Place the background blank or source as indicated by the prompt in the *i*Solo sample holder.

6. Close the sample slide and press the **Enter** key to begin the daily QC measurement.

7. After the daily QC measurement has completed, open the sample slide and remove the source.

8. Repeat steps 1 - 7 for other daily QC measurements.

D. Updating *i*Solo Firmware

The *i*Solo® Flash Loader Utility is a resident program that resides in the protected boot blocks of the flash memory, and allows the user application program to be loaded into the flash memory using a standard PC based communications program (such as HyperTerminal™).

This feature greatly enhances the ability to upgrade the *i*Series™ products in the field.

Setting Up HyperTerminal

This section contain the instructions necessary to set up HyperTerminal.

1. HyperTerminal is normally found under the
    Start | Programs | Accessories | Communications menu as shown in Figure 5.
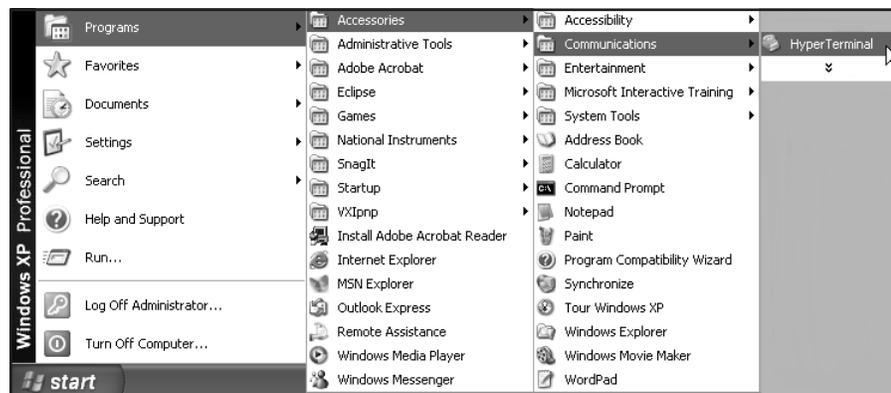
Figure 5 Starting HyperTerminal

2. Define an the new connection as "iSeries" as shown in Figure 6.
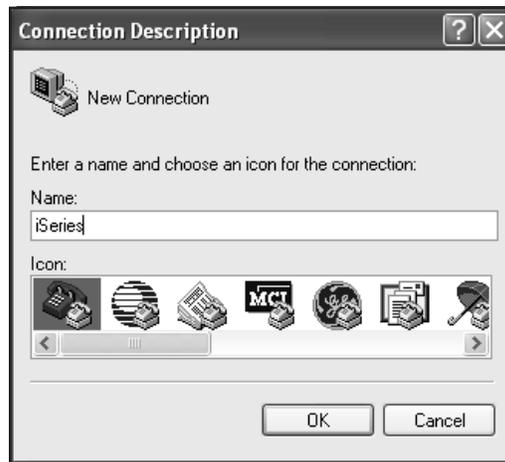
Figure 6 Entering a Connection Name

3. Choose to connect using COM1 (or COM2 as necessary) as shown in Figure 7.

Figure 7 Choosing the Communication Port

4. Select the following communication properties (Figure 8):

- 57600 bits per second

- 8 data bits

- No parity

- 2 stop bits

- No flow control

Figure 8 Entering the Communication Properties

Using the Flash Loader Utility

This section contain the instruction necessary to use the Flash Loader Utility.

1. Connect an RS-232 cable between the rear panel RS-232 connector of the *i*Solo and the COM1 (or COM2) connector of the PC.

2. Open the "iSeries" HyperTerminal connection.

3. While holding down the spacebar on the PC keyboard, apply power to the iSeries instrument. The following message in the HyperTerminal window indicates that the instrument entered the iSeries Flash Loader Utility program and identified the flash memory:

```
iSeries Flash Loader Utility
Version 1.0 Boot Loader

Toshiba TC58FVB641FT flash

Type 'H' for help

iSeries> _
```

4. Entering an "H" will bring up the Help menu:

```
iSeries Flash Loader Utility
Version 1.0 Boot Loader

    H       Display this help
    D       Display flash memory
    L       Load flash from *.hex file
    R       Read Ethernet MAC address

iSeries>
```

5. Enter an "L" to start the flash memory programming process:

```
iSeries> l
Start sending file via Xmodem protocol...
```

6. Start the transfer by selecting **Transfer | Send File…** from the HyperTerminal menu as shown in Figure 9.
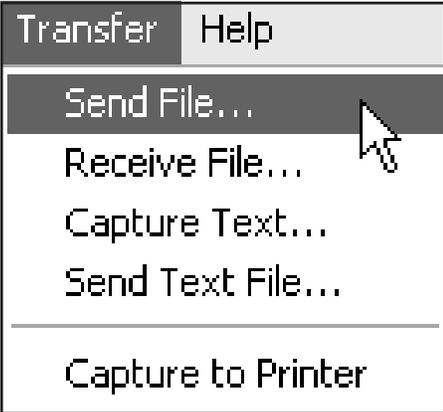
Figure 9 Transferring Files

7. Select the file to be sent and Xmodem Protocol as shown in Figure 10.
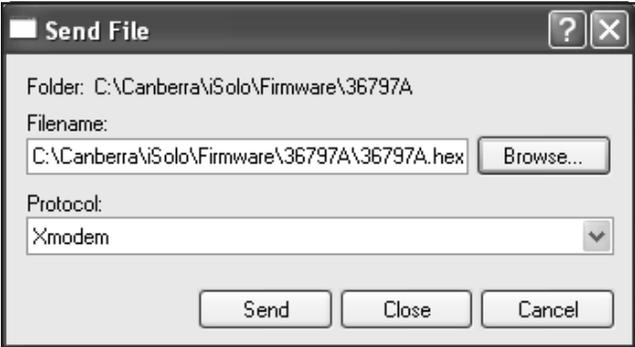
Figure 10 Selecting the File to Transfer

8. HyperTerminal will then transfer the firmware file to the unit as shown in Figure 11.
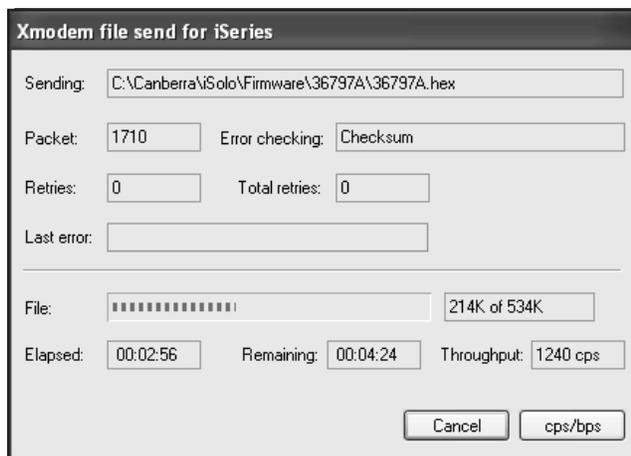
Figure 11 File Transfer in Process

9. Completion of the transfer is indicated by the "Done" message:

```
iSeries> l
Start sending file via Xmodem protocol...

Done

iSeries> _
```

10. Turn off power to the *i*Series instrument.

11. While holding down the Cancel key on the front panel, apply power to the iSeries instrument. If the firmware upgrade is significant, the Master Clear sequence will happen automatically.

    The "Master Clear", "InitProtRAM", "InitUIDs", "EraseSpectrum" and "Power On Self Test Passed" messages should appear sequentially along the bottom of the *i*Series display.

    Otherwise the Power On Options menu described on page 2 will appear. Contact Canberra as to whether a Master Clear or System Reset is required as part of the firmware upgrade as these options would require redoing calibrations and/or the gain calibration.

E. Technical Reference

This Technical Reference includes useful information about the *i*Solo® not covered elsewhere.

Installing the *i*Solo PIPS Detector

The *i*Solo PIPS® detector normally installed at the factory. The detector should not be removed needlessly because of the potential to damage the detector and mount during installation. The following instructions describe the proper method for installing or re-moving the detector in the future if ever it becomes necessary. Directions may be re-versed for removal.

Step 1

Remove the three Phillips head screws from the *i*Solo detector access cover and re-move the access cover. Extend the *i*Solo sample slide to the fully out position. Refer to Figure 12.
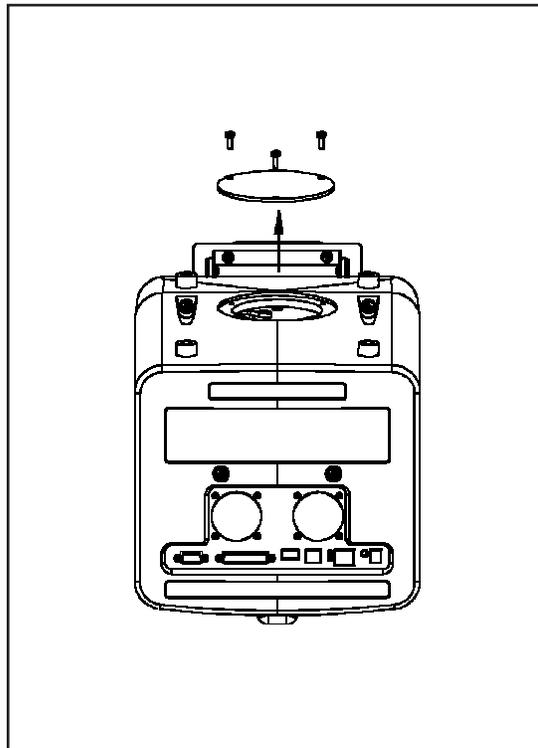
Figure 12 Removing the Screws and Access Cover

Step 2

Carefully open the PIPS detector shipping box and remove the detector being careful not to let the detector slide out of the protective cap. Screw the detector onto the detector installation base by rotating the detector clockwise. Set the base/detector assembly on a sturdy flat surface and remove the protective cap from the PIPS detector. Refer to Figure 13.
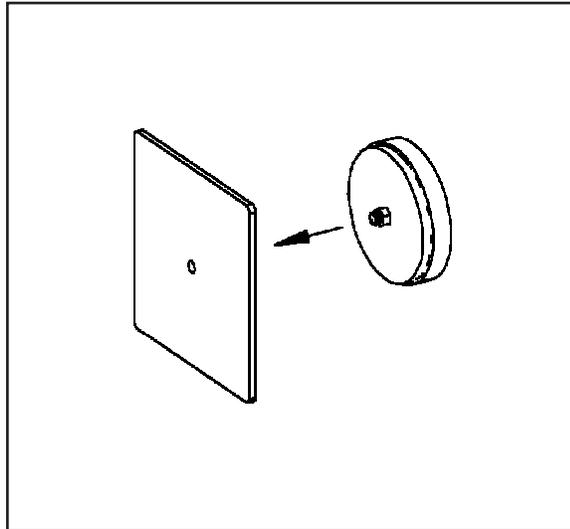
Figure 13 Installing the PIP Detector to the Installation Base

Step 3

With the base/detector assembly on a sturdy flat surface, carefully position the open end of the detector installation tool over the face of the PIPS detector and push gently while rotating the installation tool clockwise. A slight rocking of the installation tool may help in initially starting the detector into the tool. Rotate the detector/tool assembly counterclockwise to remove from the base. Refer to Figure 14.
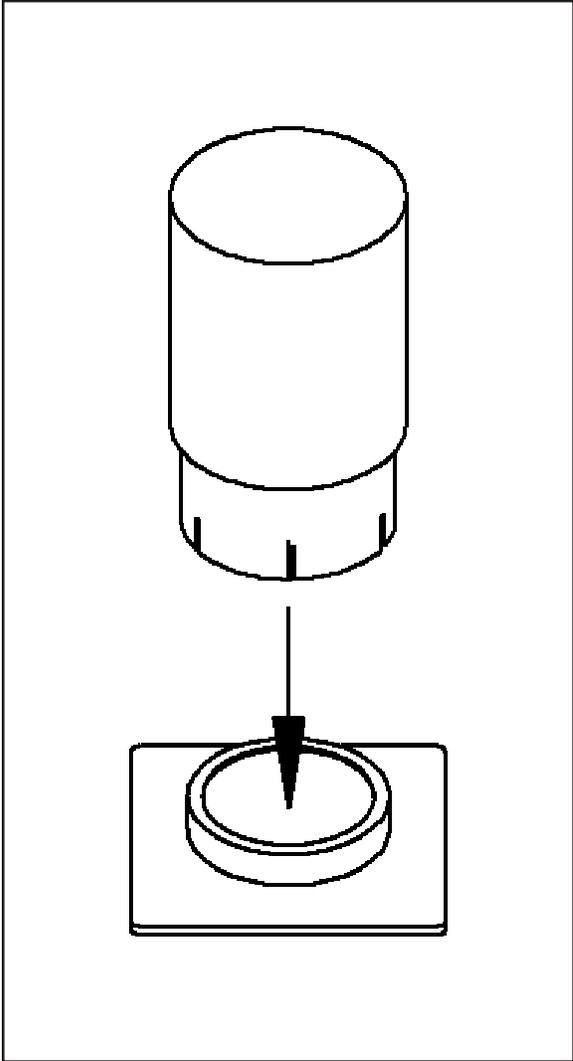
Figure 14 Using the Detector Installation Tool

Step 4

Insert the detector installation tool through the detector access opening until the PIPS detector connector is centered on the mating connector internal to the *i*Solo. Rotate the installation tool clockwise until the detector is firmly seated. Remove the insertion tool by pulling outward while continuing to rotate the tool clockwise. Replace the detector access panel. Refer to Figure 15.
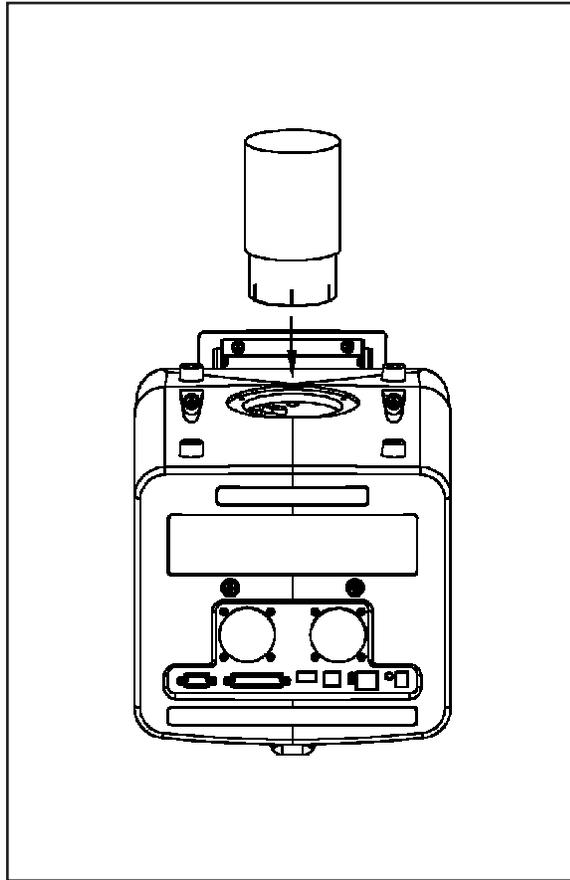
Figure 15 Placing the PIPS Detector in the *i*Solo

Cleaning the *i*Solo PIPS Detector

This section covers how to properly clean the PIPS detector.

Warning You must never use Acetone to clean the PIPS detector. Acetone attacks the conductive rubber and rubber particles are deposited onto the sensitive edge of the detector inside the detector housing.

The PIPS detector can be cleaned to remove oil film, fingerprints, or dust particles on the surface. Some recoil contamination can be removed by cleaning as well, but recoil particles are often imbedded in the surface and cannot be entirely removed.

To clean standard PIPS detectors first blow dry air or N_2 gas on the surface to remove particles that might cause scratches in the subsequent cleaning steps. Then use swabs (Texwipe® model TX762) moistened with Propanol-2. Avoid excess wetting of the swabs. Wipe very gently from the edge of the detector to the center in order to avoid pushing contaminated dust into the bevel of the housing, where it is very difficult to remove.

Repeat the cleaning treatment with fresh swaps to eliminate traces of contamination. Blow dry with dry air or N_2 gas across the detector surface and put under vacuum for 15 minutes or heat to 50 °C for an hour to remove residual moisture before installing the detector and applying bias.

Note: Cleaning is generally not effective in curing problems of: leakage current, radiation damage or excess (condensing) water vapour. Neither will it repair physical damage to the junction(s). Suspect detectors should be checked carefully for physical damage to the surface(s) before other actions are taken.

Installing the *i*Solo Batteries

The *i*Solo rechargeable, NiMH batteries are removed prior to shipment. The following instructions describe how to properly re-install these batteries.

Battery Installation

Remove both battery access covers by inserting a coin into the slot and rotating counterclockwise 90 degrees while lightly pressing inward. Insert three D-size NiMH batteries into each battery holder with the positive terminals of all batteries pointing outward. Reinstall the battery access covers by aligning the cover tabs with the holder slots, then pressing firmly while rotating the access cover 90 degrees clockwise. See Figure 16 for details.
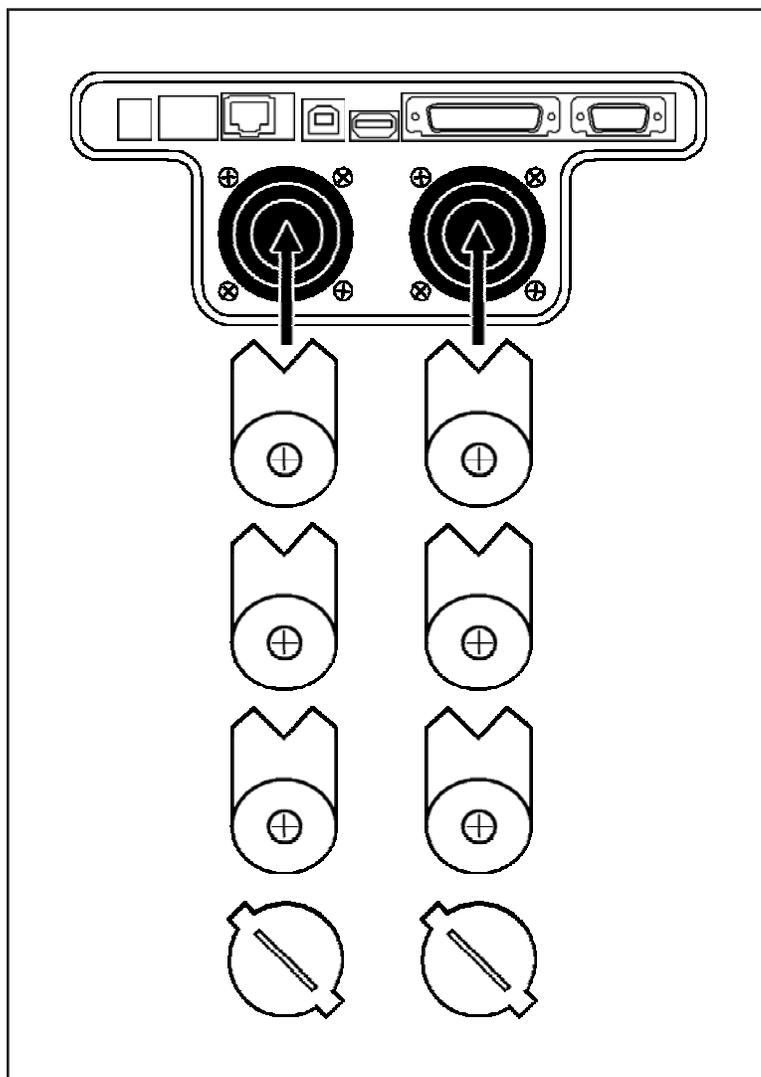
Figure 16 Installing the Batteries

Battery Care

Nickel Metal Hydride Battery

Always remove the NiMH batteries prior to shipping the *i*Solo. The batteries should be packaged such that the terminals of the individual batteries cannot contact each other or other metallic objects.

These batteries do not have an infinite shelf life and will self-discharge over time even if the unit is off. It is recommended that they be left in the *i*Solo and that the *i*Solo be plugged in whenever possible to maintain full battery charge.

Typical battery self-discharge is shown in the chart below.
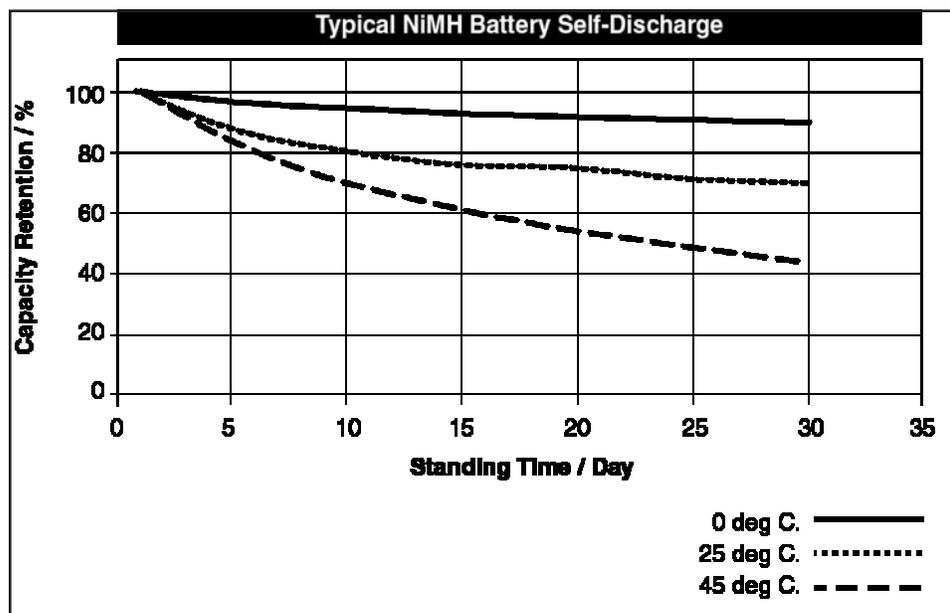
Memory Backup Battery

Internal battery for memory and real time clock.

Note: The typical battery life is 5 years. Please contact Canberra if you experience a problem with the batteries.

Protected Memory Corruption

The *i*Solo tests the status of the protected memory each time power is applied to the unit. If the "memory status word" indicates that the memory is corrupted, the unit automatically re-initializes the detector parameters, system unique identifiers and the real-time clock to default values. It then automatically initiates a system master clear.

```
Protected Memory Corrupted

Initializing…
Detector Parameters
Unique IDs
Realtime Clock




Master Clear…
```

Corruption of the protected memory is typically caused by a dead backup-battery (different from the primary power-batteries) or when a replacement controller board is installed in the instrument and the firmware is first loaded into the controller.

The presence of the "Protected Memory Corrupted" message on power-up of the *i*Solo indicates abnormal operation that should immediately be investigated.

Note: The *i*Solo will no longer be calibrated after the "Protected Memory Corrupted" message and resulting system "Master Clear".

*i*Link

Starting with version 1.1, *i*Solo will interface via RS-232 to a PC running *i*Link™. An RS-232 communications cable was supplied with the *i*Solo for this interface. Connect this cable from the rear panel RS-232 connector to the PC. In order for *i*Link to retrieve or download configuration information from or to the *i*Solo, the system must first be at the default or idle screen. Below is what this screen looks like:

```
19Jan2005   09:50:32
    Insert Sample

Selected Procedure:
    Procedure A
```

```
Press <Sel Procedure>
         or
Press <Count> to Begin
```

*i*Link cannot send parameters to the *i*Solo while the unit is involved in or performing any activity. Conversely, *i*Solo will not allow local changes to be made during the transfer of parameters from *i*Link to the *i*Solo. During especially long transfers from *i*Link to *i*Solo you may see:

```
Communication Lock
System in Use by Host
```

```
Please Wait
For Timeout or Release
```

Since most transfers happen very quickly, it is not likely that you will see this screen.

Barcode Reader

Starting with version 1.1, *i*Solo supports the optional barcode reader. When installed, the barcode reader will beep when it has correctly read a barcode installed on the sample holder as the sample drawer slides into the *i*Solo. The barcode will appear with the sample data on printed reports from *i*Solo if the Sample ID field within the report definition is selected.

F. Specifications

Notes: For complete list of accessories, please refer to the *i*Solo Alpha/Beta Counting System Super Spec Sheet.

Performance specifications are guaranteed at the Canberra manufacturing facility.

Performance

BACKGROUND – Sample detector threshold set at 125 keV and guard detector discriminator set at 10%.

Model SOLO300U, unguarded

Alpha: 0.10 cpm guaranteed   0.08 cpm typical

Beta: 33.0 cpm guaranteed   25.0 cpm typical

Model SOLO300G, guarded

Alpha: 0.08 cpm guaranteed   0.05 cpm typical

Beta: 12.0 cpm guaranteed   9.0 cpm typical

Note: Alpha background for 3.0 MeV to 9.6 MeV and Beta background for 125 keV to 2.2 MeV.

EFFICIENCY

Guaranteed 50 mm efficiency:

^{241}Am: alpha 30.0%

^{90}Sr: beta 22.0%

Typical efficiency:

Source	16 mm	25 mm	36 mm	50 mm
^{241}Am alpha	39.9%	39.5%	38.2%	33.8%
^{90}Sr beta	29.6%	29.3%	28.4%	25.1%
^{60}Co beta	12.0%	11.8%	11.5%	10.1%

Note: Efficiencies based on a 2000 mm² area, 300 µm sensitive depth PIPS detector.

Physical

DISPLAY – 160 x 80 pixel LCD graphic display with LED backlight (67.2 x 33.6 mm high viewing area with 0.39 x 0.39 mm pixel size).

COMPATIBLE FILTER SIZES - Loose filters up to maximum 60 mm diameter. Optional holders for NFS/RPS, PAS and SAS card mounted filters.

POWER – 100-240 V, ~1.8 A, 50-60 Hz into ac to dc converter; 9-15 V dc input, 5 A, maximum input to *i*Solo.

SIZE – 25 x 27 x 37 cm including the 3 cm handle (10 x 10.5 x 14.5 in., 1.2 in. handle)

WEIGHT (approximate) – unguarded: 6.5 kg (14 lb); guarded: 8.6 kg (19 lb)

Environmental

OPERATING TEMPERATURE – Range: 10 to 40 °C (50 to 104 °F) , non-condensing humidity.

Rear Panel Connections

Power – 9-15 V, 5 A max.

10/100 Ethernet – Future option.

USB Peripheral – Full Speed USB interface for host communication; rear panel USB Series B connector.

USB Host – Future option.

Printer – Parallel port.

RS-232C – Used to connect the *i*Solo to a computer or data logger for data transfer and for use with *i*Link.

Supplied Accessories

RS-232C cable – 1.8 m (6 ft).

Ac/dc power converter – auto sensing 100-240 V ac, 50-60 Hz input, 12 V dc, 5.0 A output.

Detector installation tool and base.

Calibration source holder – SH-CAL 60 mm x 3 mm deep with SH-SHIM shim kit.

G. Installation Considerations

This unit complies with all applicable European Union requirements.

Preventive Maintenance

Preventive maintenance is not required for this unit.

When needed, the front panel of the unit may be cleaned. Remove power from the unit before, cleaning. Use only a soft cloth dampened with warm water and make sure unit is fully dry before restoring power.

With exception to the PIPS® detector as discussed in Appendix E, *Technical Reference*, there are no internal adjustments or maintenance required.

Any repairs or maintenance should be performed by a qualified Canberra service representative. Failure to use exact replacement components, or failure to reassemble the unit as delivered, may affect the unit's compliance with the specified EU requirements.

Notes

Index

Notes

Warranty

Canberra (we, us, our) warrants to the customer (you, your) that for a period of ninety (90) days from the date of shipment, software provided by us in connection with equipment manufactured by us shall operate in accordance with applicable specifications when used with equipment manufactured by us and that the media on which the software is provided shall be free from defects. We also warrant that (A) equipment manufactured by us shall be free from defects in materials and workmanship for a period of one (1) year from the date of shipment of such equipment, and (B) services performed by us in connection with such equipment, such as site supervision and installation services relating to the equipment, shall be free from defects for a period of one (1) year from the date of performance of such services.

If defects in materials or workmanship are discovered within the applicable warranty period as set forth above, we shall, at our option and cost, (A) in the case of defective software or equipment, either repair or replace the software or equipment, or (B) in the case of defective services, reperform such services.

LIMITATIONS

EXCEPT AS SET FORTH HEREIN, NO OTHER WARRANTIES OR REMEDIES, WHETHER STATUTORY, WRITTEN, ORAL, EXPRESSED, IMPLIED (INCLUDING WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE) OR OTHERWISE, SHALL APPLY. IN NO EVENT SHALL CANBERRA HAVE ANY LIABILITY FOR ANY SPECIAL, EXEMPLARY, PUNITIVE, INDIRECT OR CONSEQUENTIAL LOSSES OR DAMAGES OF ANY NATURE WHATSOEVER, WHETHER AS A RESULT OF BREACH OF CONTRACT, TORT LIABILITY (INCLUDING NEGLIGENCE), STRICT LIABILITY OR OTHERWISE. REPAIR OR REPLACEMENT OF THE SOFTWARE OR EQUIPMENT DURING THE APPLICABLE WARRANTY PERIOD AT CANBERRA'S COST, OR, IN THE CASE OF DEFECTIVE SERVICES, REPERFORMANCE AT CANBERRA'S COST, IS YOUR SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY.

EXCLUSIONS

Our warranty does not cover damage to equipment which has been altered or modified without our written permission or damage which has been caused by abuse, misuse, accident, neglect or unusual physical or electrical stress, as determined by our Service Personnel.

We are under no obligation to provide warranty service if adjustment or repair is required because of damage caused by other than ordinary use or if the equipment is serviced or repaired, or if an attempt is made to service or repair the equipment, by other than our Service Personnel without our prior approval.

Our warranty does not cover detector damage due to neutrons or heavy charged particles. Failure of beryllium, carbon composite, or polymer windows, or of windowless detectors caused by physical or chemical damage from the environment is not covered by warranty.

We are not responsible for damage sustained in transit. You should examine shipments upon receipt for evidence of damage caused in transit. If damage is found, notify us and the carrier immediately. Keep all packages, materials and documents, including the freight bill, invoice and packing list.

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