

PORTABLE ISOTOPE IDENTIFIER



PI 1002E



PI 1002I

NUCLEONIX SYSTEMS PRIVATE LIMITED

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FILE NAME : NSPL/DOC / MAN/PI1002E / 01

VER_20160926

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UNPACKING

The Portable Isotope Identifier Type: PI 1002 has been thoroughly tested and is dispatched in ready to assemble condition. However, on unpacking and prior to operation, it is advisable to check visually and make sure that there is no visible damage caused in transit. Also checkup the items (instrument / accessories / cables etc.) physically by verifying with the packing list contents for correct types & quantities. Any discrepancy if found, may please be communicated by email to Head, Customer support division.

Typical packed carton & wooden crates contain

- (a) Portable Isotope Identifier.
- (b) 2"X 2" or 3"X3" NaI probe to the external unit or 1 $\frac{1}{2}$ " X 1 $\frac{1}{2}$ " Na or 1"X1" LaBr internal to the unit.
- (c) Necessary connecting cables
- (d) Charger unit

All these items on receiving are to be unpacked carefully & inspected visually.

If any damage to the instrument is observed, do not switch ON the unit and report the matter immediately to:

Head CSD

Customer Support Division

Nucleonix Systems Private Limited

Plot No: 162 A & B, PHASE II,

I.D.A. Cherlapally, Hyderabad - 500 051.

Phone: +91-40-27263701, 040-27262146, 040-68888777, Fax: 040 – 27262146

Mobile No: 7331104480, 7331104481, 7331104482, E-mail: info@nucleonix.com.net

In all correspondence regarding the instrument, please mention the type, serial number of the unit, date of supply etc., of the unit.

Portable Isotope Identifier PI 1002 detects and identifies multiple radionuclides, provides quantified results using field strength analysis and stores the results & spectrum for future reference.

The instrument can be operated in the **Identifier, MCA** and **Dosimeter mode** of operation for data acquisition. This instrument performs all the tasks needed in the infield survey, detection and quantification of radioisotopes. The **Administrative mode** allows the user to see the internal configuration and settings of the instrument that is used for identification of radioisotopes. This manual will cover aspects of both general and administrative modes, with emphasis on operation in the general modes.

At power up by default the device is in **Mode Selection Menu**, from this menu user can access any of the following modes: **Identifier mode, MCA mode, Transfer stored spectrum mode, Administrator mode and Dosimeter mode**.

The instrument has a simple user interface and a wide range of setup functions and utilities.

The PI 1002 can be connected to a remote computer using a serial cable, and can be accessed with any RS-232 program that allows the user to capture the file in *.txt format which is then accessed with **PHAST** (quantitative analysis) software. The PHAST software provides full functionality of **Multi Channel Analyzer (MCA)** analysis with all necessary options to do advanced offline analysis possible using MCA.

The PI 1002 unit consists of:

- The spectrometer electronic unit and
- The gamma ray detector – Either built-in or external to the unit electronics.

Optional devices/software include

- A personal computer.
- PHAST software.

In case of external detector configuration for (2"X2") & (3"X3") NaI detector HV dynode bleeder chain and pre-amp buffer are integrated in a compact cylindrical shell which is plugged on to the NaI integral assembly.

This part of the circuits will be built-in for 1 ½ X 1 ½ " NaI or 1"X 1" LaBr detector configurations. Li-Ion battery pack is built-in to the main unit and the charger unit/adaptor will be external to this.

Detector

- Crystal : (2" x 2") or NAI (TI), 3" X 3" NaI detector assembly external or 1½ "X1 ½ " NaI or 1"X1" LaBr built-in with NaI detector and 35% resolution with 1"X1" LaBr.
- Bias : (0-1200V)e 0.5A compact HV module-built-in.
Actual operating voltage calibrated to each module.
- FWHM : 7.5% at 662 KeV for Cs-137

Pulse Processing

- Type : Four stage spectroscopy amplifier.
- Gain : Adjusted for full range
- LLD : Through trim pot
- ULD : Through trim pot

ADC

- Type : 18-bit SAR
- Speed : 400 KSPS

Spectrum Conversion

- Conversion : 10-bit
- Data space : 32-bit per channel

System Controller

- Processor : MSP430 CPU
- Display : 320x240 high contrast 32000 colors TFT LCD.
- Controls : 7-key's
- I/O : Rs-232 port for computer connections with 9600-8-N-1 configuration.
- Clock : 8 MHz crystal and standard watch crystal.

Minimum detection time: 1 sec

Effective Operating range

- Energy : 150 KeV to 3 Mev.
- Field : 0 µR/Hr to 2000 µR/Hr for Cs-137

Power

- Batteries : Internal 2x4400 mAh Li-ion batteries
- Consumption : 3.7 W

Charger

- Type : External to instrument.
- Connector : Jack pin connector on Instrument.

Operating time

- Normal operation: 15 hours continuous operation with fully charged batteries.

Charging Time

- Charging time: 5 hours for full discharged battery.

Turn on the instrument unit by push to **ON** switch labeled as **ON/OFF** will show the startup “Welcome screen” on the LCD display. This welcome screen will hold for 20 seconds and then the unit will log into the **Mode selection menu**. The instrument is now ready for use. Bingo! ...welcome to the world of Activity!

3.1 Basic Operation

User can select any menu using five keys in the keypad. By pressing the **Mode key** user can have access to **Mode select menu** from any sub menu. By pressing the **Backspace key** user can go to previous menu. Further, these keys will also be used as move left and move right keys in sub-menu. The **Up** and **Down** arrow key can be used for selecting the choice of menu, the current selection will be seen as underlined, **Up** and **Down key** can serve the purpose of selecting the menu. Sub-menu selection will roll back after reaching the end of all possible selections. Menu option highlighted can be selected by pressing the **Enter key**.

The **Dosimeter mode** displays the “count per second (cps)” detected by the instrument after background cancellation. Instrument display will have a green rectangle on screen if count rate is below permissible level, if the count rate increases beyond the alarm conditions both audio and visual alarm will be set. Data acquisition can continue only after resetting the alarm, user can select any operation mode from **Mode selection menu** after resetting the alarm.

The **MCA mode** gives all the flexibility to operate the unit as **Portable MCA** for online preliminary analysis and offline advance analysis.

The **Identifier mode** gives the functionality to use the instrument in detecting the presence of radiation and option to identify the radionuclide present. This mode also quantifies the amount of field present in $\mu\text{R}/\text{Hr}$.

The **Administrator mode** gives the functionality to verify and update the stored threshold and radionuclide parameters in field without reprogramming the instrument. This mode is password protected.

The **Transfer stored spectrum mode** provides interface between instrument and PC for offline advanced analysis of stored spectrum.

The instrument can be reset using the **Reset key**, which provides soft reset to the system. To turn off the instrument user have to use the **ON/OFF** push button switch.

3.2 Menu

Review of stored spectra, Review of stored thresholds, configurations and many other features can be accessed from the user or administrator (password protected) menu. The menu can be accessed from any of the search modes by pressing the **Mode key**.

3.3 Description of Keypad and other Keys

Figure 1 shows a keypad diagram of PI 1002. The **key pad** is such that it may be operated while holding the instrument and is easily accessible to people wearing protective gloves as well as both left and right handed users.



Figure 1 PI 1002 Keypad

Connecting a jack pin of charger unit to this socket in 'OFF' position of the main unit, charging can be carried out.

Figure ON/OFF

Figure 2 shows charging socket type by,



Figure 2 socket on main unit

Figure 3 shows **Reset switch** on the keypad. This switch provides soft reset signal to the controlling microcontroller and as a result resets all the systems including the HV of the detector.

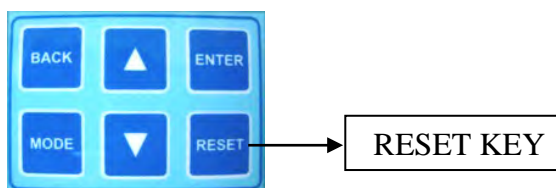


Figure 3 RESET key

The following is a brief description of above mentioned seven keys and their functionality.

RESET: This key is used to reset the instrument. This is soft reset and resets the controller, which in turn resets the whole system.

UP (↑) and DOWN : In general, these keys are used to select the menu options. Further, these keys also performs other tasks such as changing the date and time information while saving the spectrum, for continuing the data acquisition in **Dosimeter mode** after alarm reset and for zoom-in and zoom-out in **Show stored spectrum menu**.

BACK SPACE: This key is used to go to the previous menu in general, while it also performs the task of moving the selection in direction in **Administrative mode** and for changing date and time information.

MODE: This key works as the escape key, by pressing this key user can move from any sub menu to **Mode selection menu**, this key is also use for moving the selection in direction in **Administrative mode** and for changing date and time information.

Many of the common / routine operations of the portable isotope identifier PI 1002 are performed using **“Soft Keys”**. These are represented by a set of words in the screen, the key necessary for the action only will be activated and no operation will be performed by pressing the other keys.

Pressing the **Enter Key** will perform the action specified by the current highlighted soft key. For example as shown in Figure 4, after entering the **Transfer stored spectrum** menu, **Enter key** is used to open the highlighted spectrum for review and transferring it to the P.C.

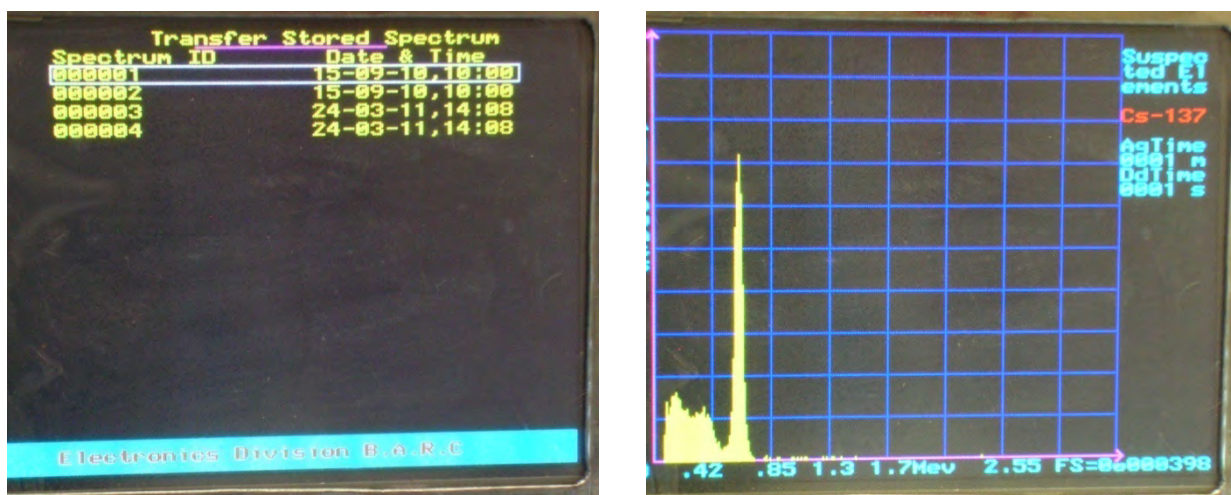


Figure 4 Example of operation using Soft keys

3.4 Display Conventions

In order to make PI 1002 more user friendly and easy to use, we have defined several color and layout conventions for the user interface.

Color Conventions

- For the measurements below the alarm level/detection level in **Identifier mode**, the values will be displayed in **green/blue color**.

- For the measurements above the alarm level/detection level in **Identifier mode**, the values will be displayed in **red color**.
- Menu and spectrum will be displayed in yellow color.
- Current selection of the menu is highlighted by white color underline or surrounding box as applicable in the menu.
- Grid is of light blue color.
- The axis marker's are in blue color.

Layout Conventions

- The background of the display is set as black
- The current menu title is displayed on the centre of first line of the display.
- The current value of full scale (Y-axis) is displayed in the right bottom corner of the energy axis (X-axis).
- The side bar displaying the online information about the spectrum is displayed in the right side of the display window.
- The visual alarm in the dosimeter menu is at the centre of the display window.
- Suspected elements will be displayed in dark blue color in the list format with the net field seen by the detector in the centre of the display area.
- The information related to current task performed is displayed in the centre of the display.
- The available options for keys are displayed either on the left block or in middle of the display as highlighted in the Figure 5.

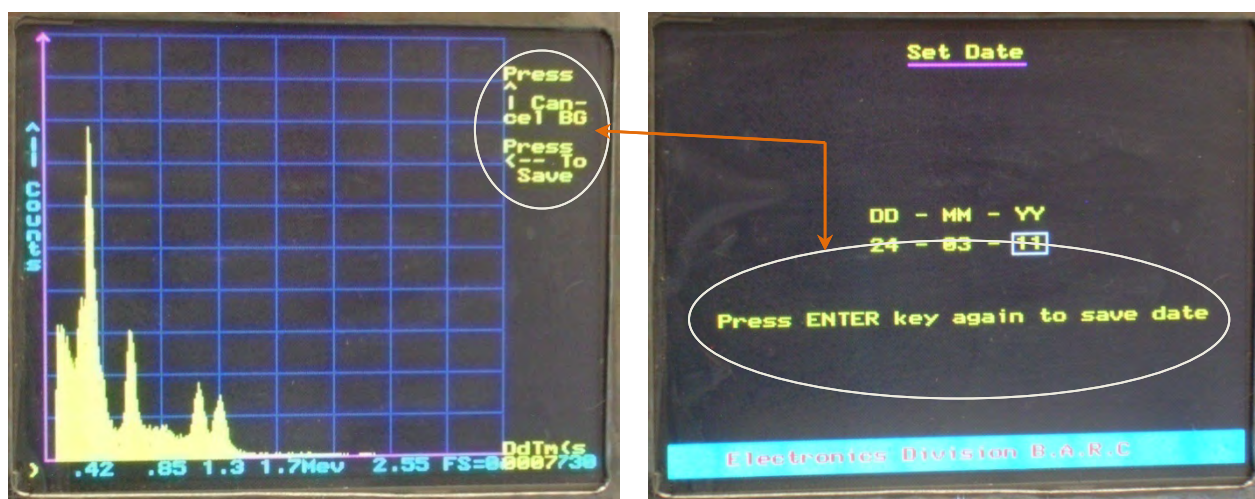


Figure 5 Key Options available

3.5 Choosing Mode of Operation

At **Power On** and after the **Reset** switch is pressed, the instrument information screen appears as shown in Figure 6. This screen holds for 20 seconds so that the instrument and detector get stable along with soft start of HV for detector. After this operation, the **mode selection menu** appears, as shown in Figure 7. On this screen, user has the option of selecting one of the displayed modes. These modes allow first line responders to perform all the tasks needed in the line of the duty. The **Administrator** function allows a health physicist or other expert to set up the device for specific applications and to perform additional

maintenance functions. The *Administrator mode* is password protected as shown in Figure 8.; where as other modes can be accessed without password.

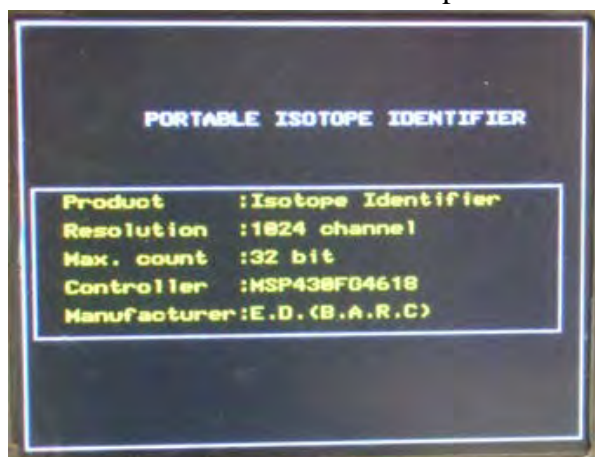


Figure 6 Instrument Information screen

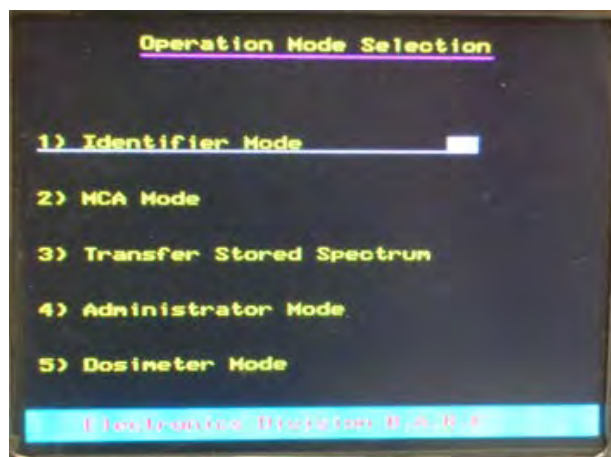


Figure 7 Mode Selection menu



Figure 8 Login Screen for Administrator mode with Password

3.6 Software

The **PHAST** software is useful for advanced users seeking additional analytical capabilities for the spectrums stored by **Anuparas**. The **PHAST** software has to be used in offline mode.

The data transferred by the **Anuparas** module to PC in the form of channel versus counts is to be saved in **.TXT** format. This format is suitable for plotting in Excel and other general software. For **PHAST** this format is to be transformed into the suitable format by using the program supplied by the name of "**BCDConvertor.jar**". This will save the file in a format suitable for **PHAST**. The **PHAST** supports both quantitative and qualitative analysis.

The PI 1002 unit has two external connectors for power, communications, and other functions. Both are located on the rear part of the instrument.

4.1 Connecting Charger

The charger module provided with the instrument has to be connected to **Jack pin** connector (**Charging and External supply**) with the cable labeled as “**Charging cable for PI 1002**”. Supply cable attached with the charger module has to be connected to a universal (110-240V, 50/60Hz) AC power supply. The green LED on the charger module indicates the status of input supply. To start the battery charging, move the Jack pin switch through on the **PI 1002** module to the charging position. The status of the charging can be observed from the LED’s on the charger module.

4.2 Connecting External supply

The **PI 1002** module can be operated with the external supply (7.5 V – 12 V DC). Connect the cable labeled as “**External supply cable for PI 1002**” into the **D9 Male connector (Charging and External supply)**. To switch ON the instrument, move the three-way switch to the **OFF** position and press the **Reset switch**. Care should be taken to avoid external DC value higher than the rated value as the instrument can be damaged by overvoltage.

4.3 Connecting serial cable for data transfer

The **PI 1002** module supports the transfer of stored spectrum to the PC terminal using USB port operating at 9600-baud rate. The configuration of the serial port is “9600-8-N-1”. User can transfer the spectrum by opening the USB port and saving the received file. The data transfer can be performed in **Transfer stored spectrum mode**.

5.1 Turning the Unit On and off

Turn on the **PI 1002** unit by pressing the **ON/OFF** switch (Figure 2) to **ON** position and then pressing the **Reset button**. This turns on the instrument and display shows the message as described in section 2

Scintillation detectors normally stabilize in about 10 minutes after the power is turned on, assuming a stable temperature environment. The HV of the detector ramps up to stable value in 20 seconds. During the ramp up, the HV of the instrument is not stable. Therefore, the instrument screen is held at information screen for this period. The user can collect the data after the HV is stable. However, it is advised to wait for 10 minutes after the instrument is turned **ON** to acquire the data. The tasks not related to acquiring of data can be performed any time after the **Mode selection menu** appears.

To turn-off, the unit, press the **ON/OFF** push button switch to **OFF** position.

5.2 Identifier Mode

The “**Identifier mode**” is normally used to detect the presence, identify the radioactive source and location of the radioactivity. This mode responds quickly and makes it easy to track the changes in radioactive (gamma) field strength, but provides less analytical details. In this mode, the instrument continuously takes readings, search for isotopes and analyzes them for dose rate and other information.

The *Identifier mode* is furtherer sub divided into different modes as shown in Figure 10 based on search algorithms and threshold values. After entering into the sub-mode the user has to select the background for the measurement. The user can select the option accordingly from the background selection menu shown in Figure 11a. After the background acquisition is complete, the user can save or discard/reacquire the background by pressing *Enter key* or any other key respectively as shown in Figure 11b. This procedure of background selection remains same in all main and sub menus and is termed as *Background acquisition* in this manual.

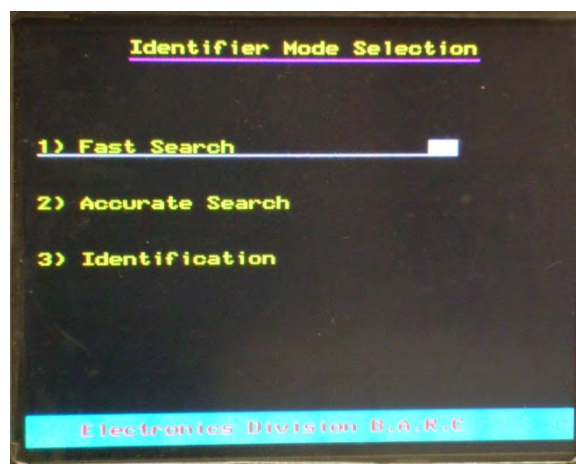


Figure 9 Identifier Mode selection menu

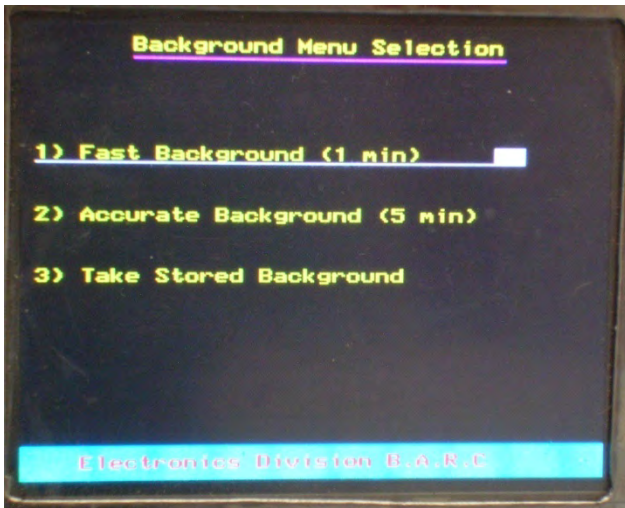


Figure 10 (a) Background selection menu (b) Menu after Background Acquisition complete

Three search modes **Fast Search**, **Accurate search** and **Identification** are available in the **Identifier Mode**. For normal use **Fast search mode** and **Accurate search mode** performs all necessary work, **Identification Mode** is used to identify the radioisotope. The search algorithm is based on the rate of change of the radiation environment & the radiation level itself. If the rate of change of radiation level with respect to the background is above a threshold, an alarm is set and the instrument tries to identify the possible elements present along with the total field measured by the detector. If the instrument is not able to identify any of the element from its look up table it displays the message as shown in the Figure 12a. Otherwise, the list of the suspected elements is displayed as shown in Figure 12b.

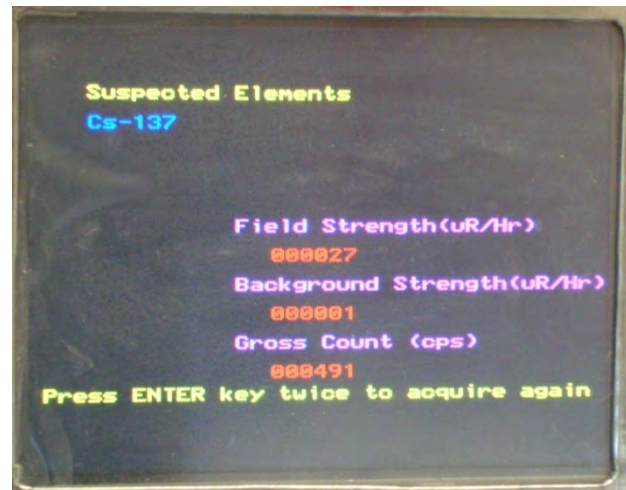
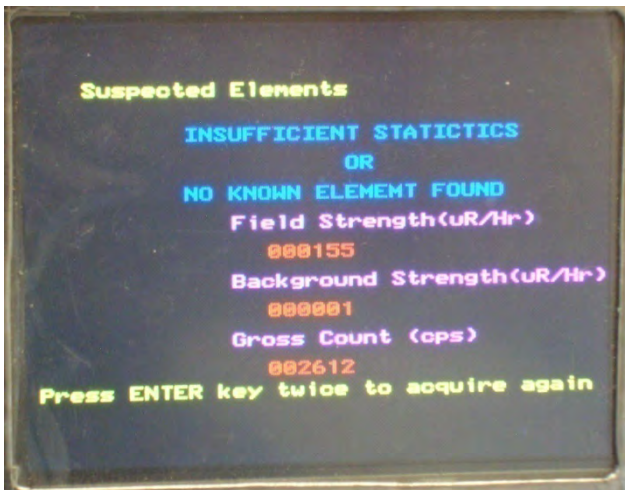


Figure 11(a) Instrument unable to identify the element (b) Cs-137 is identified as suspected element

The search modes operate on the basis of time sampling. If the rate of change of radiation is large, the instrument detects it as possible movement of radiation and sets the alarm. This method is suitable for detecting the movement of either strong or weak radiation source. The instrument is capable of detecting

up to 20 isotopes along with their calibrated field strengths. Therefore the instrument can be used for a first hand approximation of the field strength.

5.3 MCA mode

The “**MCA mode**” is normally used for spectroscopy of the radioactive samples. This mode has three sub modes of operation as shown in Figure 13. The **Show Stored Spectrum** mode is for examining the spectrum from the list of stored spectrums. The user can select the spectrum for preview and qualitative observations.

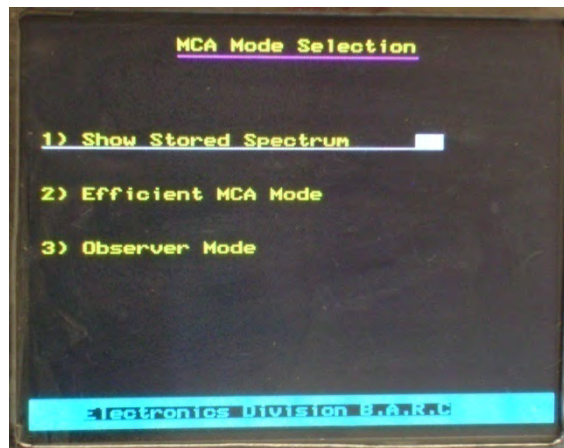


Figure 12 MCA mode selection menu

Zoom-in and **Zoom-out** functions are implemented using **UP (↑)** and **DOWN (↓)** keys. While doing **Zoom-in** the channels whose Y axis is out of range of the display is omitted. This allows the user to focus on the region of interest as shown in Figure 14a and 14b respectively. Peak shown in Figure 14a is omitted after zoom-in as shown in Figure 14b.

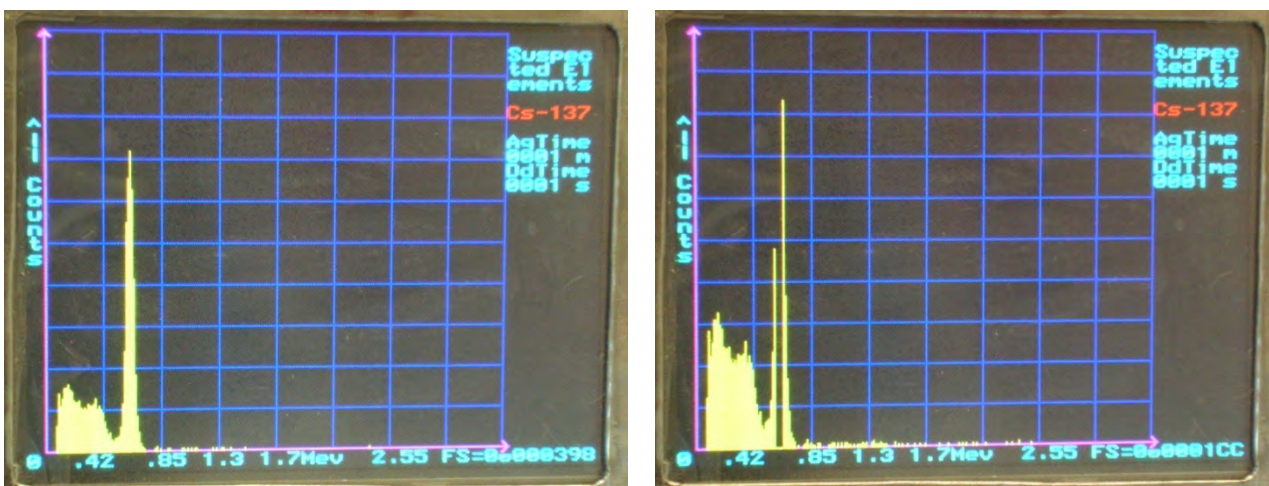


Figure 13a Original spectrum Figure 14b Spectrum after Zoom-in

The **Efficient MCA mode** and **Observer mode** follows the same sequence and provides the same functionality. The only difference is in the display of online information in the side bar. The online information in the side will be present in the **Observer mode**, where as it is absent in the **Efficient MCA mode**. This is done to efficiently use the resources in the **Efficient MCA mode**. The *Efficient MCA mode* of operation is useful when no observation has to be made while taking the data. The screen shots of *Observer mode* and *Efficient MCA mode* are depicted in Figure 15 and Figure 17 respectively.

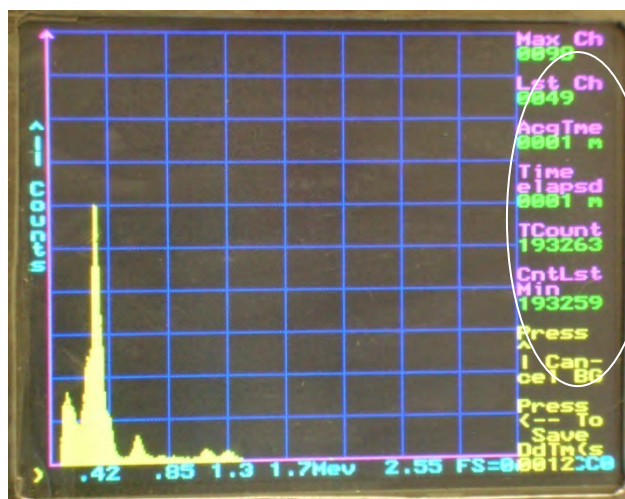


Figure 14 Instrument in Observer mode

After entering into **Efficient MCA mode** or **Observer mode**, user has to perform **Background acquisition** as per procedure explained in the **Identifier mode (section 5.2)**.

After **Background acquisition**, the user has to set the MCA time in the menu labeled as “**Set MCA time**” as shown in Figure 16. User can change the selection by using **UP (↑)** and **DOWN (↓)** keys and can press **Enter key** to select the current selection and to proceed for data acquisition.

The time selected by the user represents the **TOTAL time** for which the data is acquired. The instrument does not perform **Dead time correction** it only provides **Dead time** information. The saved spectrums are without dead time correction. The dead time information is sent to the P.C terminal in **Transfer stored spectrum mode**. The dead time correction has to be done on the P.C. side.

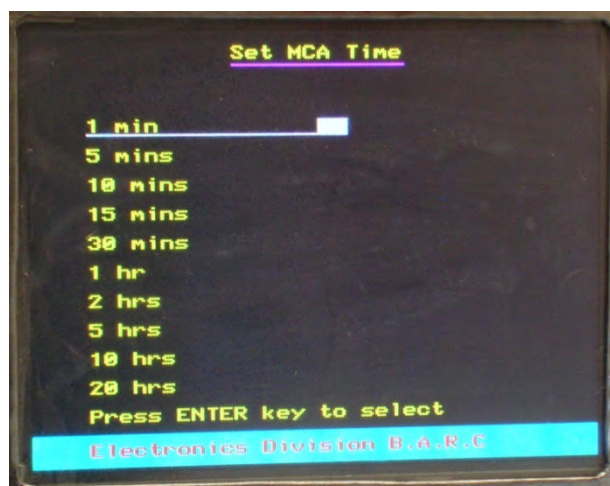


Figure 15 SET MCA Time menu

After the data acquisition is over, options to cancel background and save without background cancellation appears in the side bar area. Information about the dead time is displayed in the right bottom corner of the display (shown in Figure 17a).

User has a choice to save spectrum directly without background cancellation or after the background cancellation as shown in Figure 17.

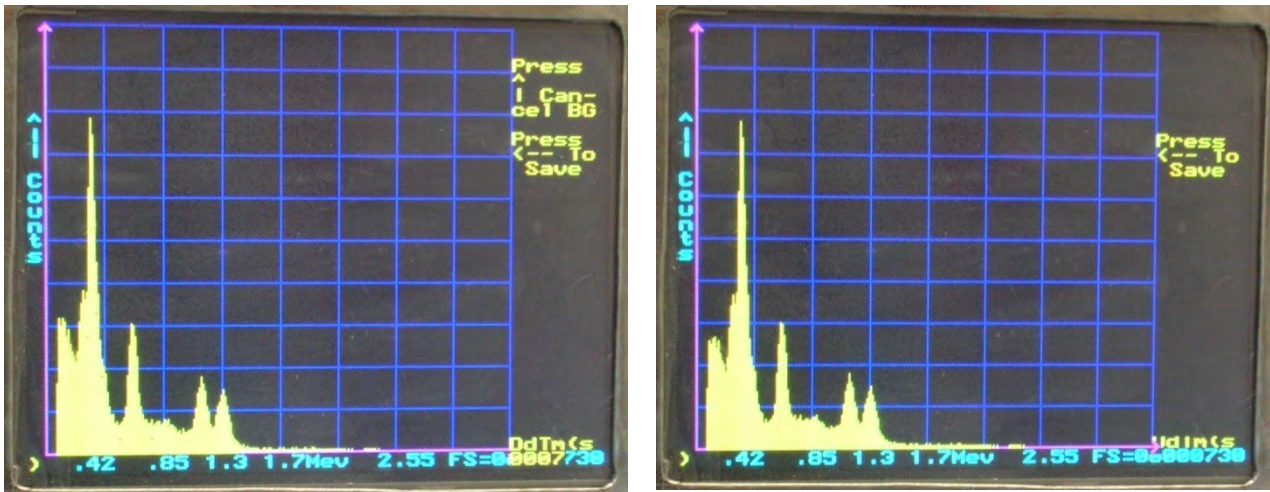


Figure 16a Display options after Data acquisition and Display after background cancellation

It is to remind that, the user can discard the options in any sub-menu and can jump directly to main **Mode selection menu** by pressing the **Mode Key**.

After choosing the save spectrum option, the instrument prompts the user to stamp the spectrum with date and time and issue a unique **spectrum identification (Spec_Id)** number automatically. The instrument can save up to 18 spectrums in its internal memory. It will overwrite the first spectrum after the 18th spectrum and so on. The user has to change the date and time information using five keys available on instrument panel (in Figure 1). The current selection will be highlighted by a white box surrounding the selection as shown in figure 18. The sequence of saving the spectrum is depicted in Figure 18. The user has to press the **Enter key** twice for saving the spectrum. The time and date set by the user will be remembered by the instrument for next time, so that user has to do only incremental change every time. The format of the date is **DD-MM-YY** while that of the time is in **24-hour format**. After entering the date and time information a message showing successful saving of data along with unique **Spec_Id** is displayed.

User should make a note of this **Spec_Id** for future reference as this makes the spectrum unique in the controller memory. The acquisition time and suspected elements are also displayed in this menu. User can directly go to the **Set MCA time menu** by pressing the **Enter key** or can switch to **Mode selection menu** by pressing the **Mode key**.

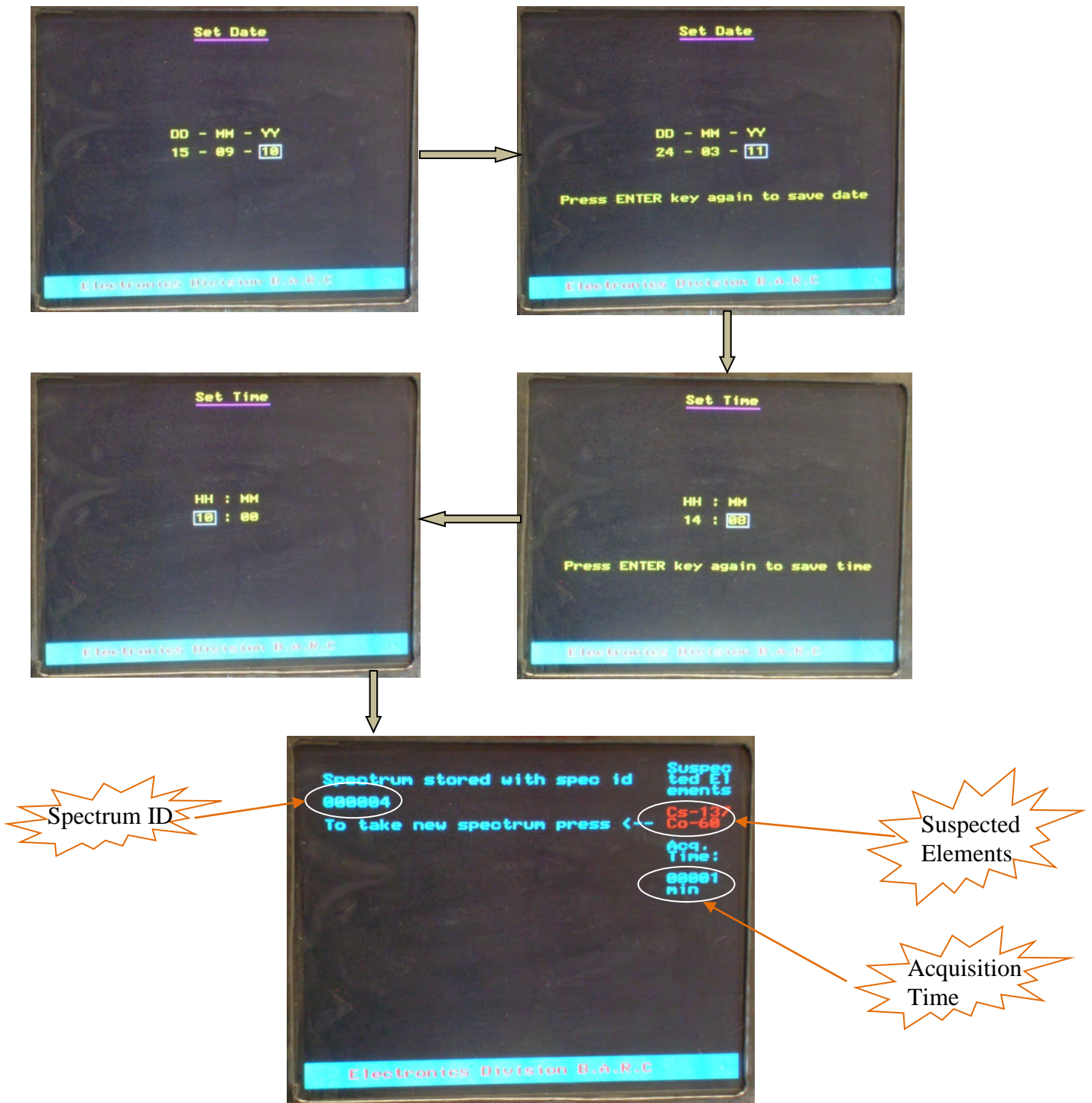


Figure 17 Sequence of saving the spectrum with date and time stamping and Spectrum id

5.4 Transfer Stored Spectrum

This menu is useful when user wants to transfer the spectrums stored in the internal memory of the instrument to PC for further/advance analysis. The dead time and live time information is also sent along with the spectrum. The spectrum is transferred in two column **HEX** format having channel no. in first column and corresponding counts in the second column with a **TAB** separating two columns. The format and speed of the transfer is pre-configured. The RS-232 configuration for serial communication is 9600-8-N-1. i.e.

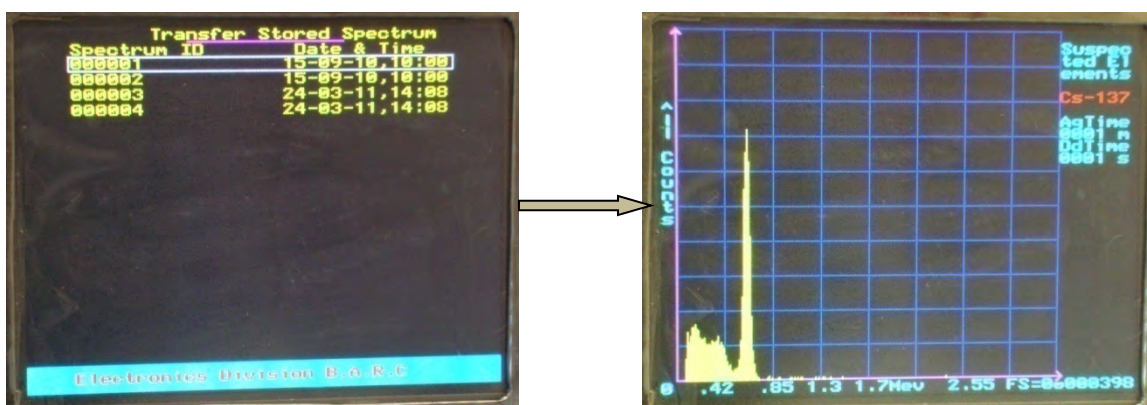
Baud rate: 9600
Data bits: 8
Parity: None
Stop bit: 1
Flow Control: None

The user should check whether the cable is plugged in the correct connector or not. Further, user should open the PC COM PORT with above mentioned configuration and command the PC to save the data in *.txt format before starting the transfer. It is advised to save every spectrum with different filename. The user can resend the data as many times as he/she wants.

The steps of transferring the stored spectrum are shown in Figure 19 and are explained below:

The current selection in the selection menu will be highlighted by white box and this selection can be entered by pressing the **ENTER** key. The selected spectrum will be displayed and can be zoom-in or zoom-out. Pressing the **ENTER** key starts the transfer of spectrum to PC by displaying corresponding message as shown in Figure 19. After the spectrum transfer is over, the user can re-transmit the data by pressing the **ENTER** key or can go to the spectrum selection menu or to the main menu by pressing the **BACKSPACE** key and **MODE** key respectively.

The file saved in the “XYZ.txt” name can be transformed to the format suitable for the **PHAST** software using the program labeled as “**BCDConvertor.jar**” (supplied with the instrument). This program will change the format from **HEX** to decimal and save it in the same location of the original file with the name “**XYX_bcd.txt**”. The user can give the location of the folder containing more than one file to convert all the files in that folder to decimal format at once. These transformed files can be directly taken as inputs to the **PHAST** software for offline analysis.



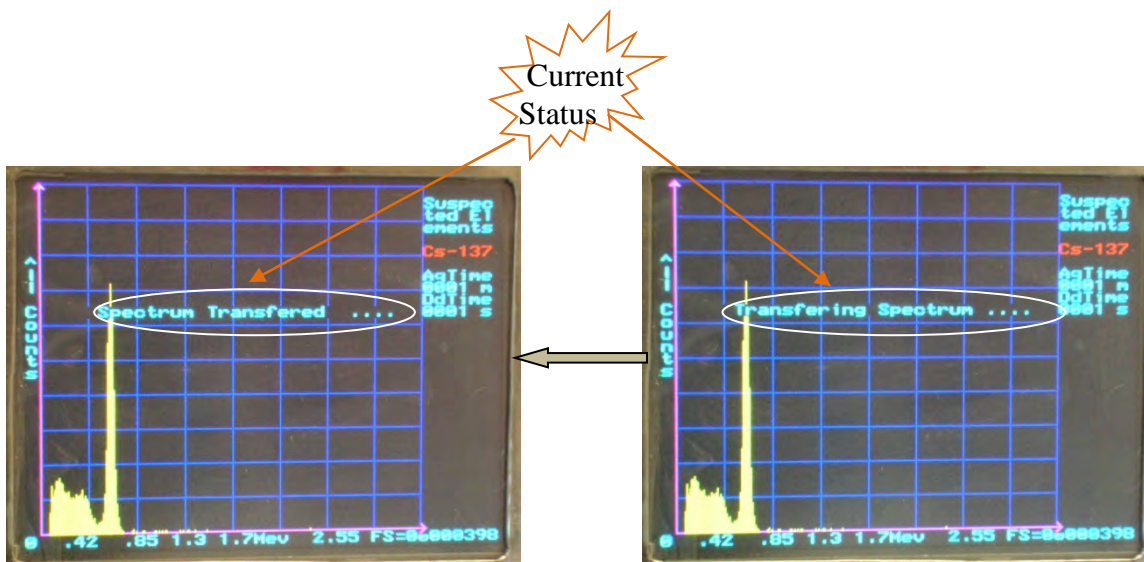


Figure 18 Steps for Transferring the stored spectrum to P.C.

5.5 Administrator mode

This mode provides authorized user access to internal configurations of the instrument. In this mode, look up tables containing the threshold rates and ROI (region of interest) channel numbers of different radionuclide's can be updated. This feature is provided to recalibrate (Energy calibration) the instrument for any kind of variations with out reprogramming. This configuration data can only be changed by advanced users, as this will affect the working and detection algorithm directly. This mode is password protected which is of 4 digit (0-9) strength. User can log on this menu to change the **Administrator menu** password, to observe/change the configuration settings and for the manual calibration.

The snapshots of the procedure to enter and use the administrator mode are shown in Figure 20.

The present selection is highlighted by the white box and pressing the **ENTER** key selects the current highlighted option. The **BACKSPACE** and **MODE** key are use as an e res ectively. The user can change the value by pressing the **UP** and **DOWN** key. When the user enters the “**Show Stored Specification**” menu the working of keys changes, now user can use **UP & DOWN** key to change the values and **ENTER** key to save the current value and jump to next column. After user reaches to the end of row selection, the selection point will move to next row. User can press **Mode** key to save and exit the **Administrator mode**. For the fast entering of the values in the **Administrator Mode**, pressing the **UP** key will increase the value by 10 and the **DOWN** key will decrease the value by unity.

If the user enters the wrong password, the screen displays the corresponding message in **RED color**. If the entered password is correct, no message is displayed and user is directed to corresponding **Administrator mode menu**.

Figure 20 shows the subsequent menu when the user selects the Administrator mode from Mode selection menu. After the password is entered user has to press the **ENTER** key. The next snap shows the screen with message when incorrect password is entered. If the user enters the correct password, the third snap shown in figure 20 appears with options to change the existing **Administrator password** or review the configuration.

5.6 Dosimeter Mode

Dosimeter mode gives the user possibility to compare the field strength of two locations in terms of counts per second (CPS). This mode displays the following information in real time

- Total Count
- Time Elapsed
- Count rate
- Count in last second
- Visual Alarm

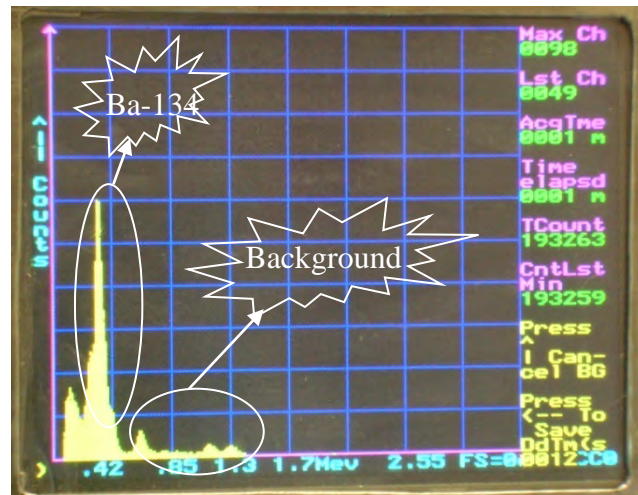
The display is updated per second and time slicing technique is used to set the alarm. Whenever the rate of the radiation is above the alarm threshold, both visual and audio alarm is set. Alarm should be reset before proceeding further. Pressing **Enter key** will reset the audio alarm but visual alarm will not be reset and still holds to be **RED** to signify that the alarm level had crossed. User can continue to acquire the data by pressing the **UP (↑) key** but data will now be displayed in the **RED color** font and alarm will not be set even if the radiation level crosses the threshold. If the **Backspace key** is pressed, the alarm will be set when the threshold is crossed. From this menu by pressing the **Enter key** user can directly log into the **Identifier menu**.

This menu can be used to find the location of the source as we near the source the rate will increase so from the “Count in last second” values we can find the location of the stationary source and trace it then we can go for identifier menu to identify the elements present and corresponding field strength.

Background cancellation has been incorporated in the online calculations and setting of the **Audio and Visual alarm**. Effect of the background cancellation is shown in the Figure 21. In this picture the first snap represents the Background (Cs-137 and Co-60). Second represents the spectrum with added element Ba-134 and third snap represents the spectrum after background cancellation. This background helps in finding the radiation additive to the background and effectiveness of the **PI 1002** to implement the same.



Snap 1



Snap 2

Snap 3

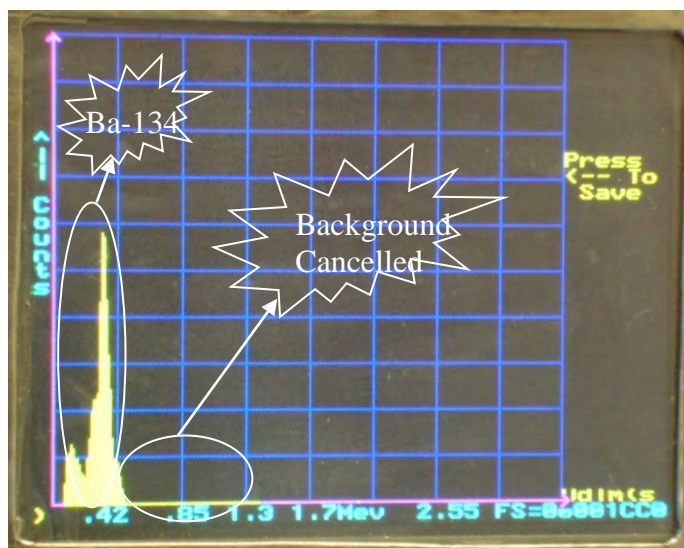


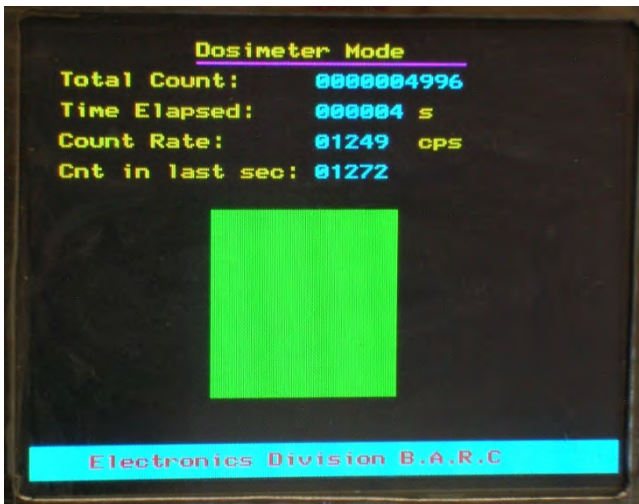
Figure 21 Effect of Background cancellation

The dosimeter operation is shown in Figure 22. This mode is very useful in the situation when you are not sure of the location of the radioactive element. The figure 22 has the sub parts as mentioned below.

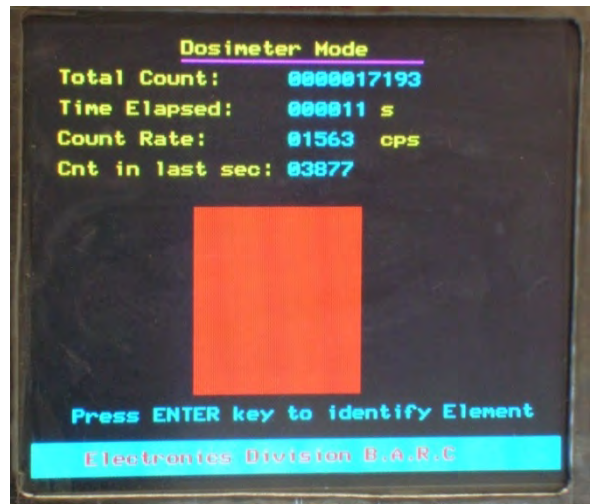
Snap 1 show the display when operating in the dosimeter mode and no alarm is set.

Snap 2 show the display after the alarm is set pressing the **Enter** key at this time will reset the alarm.

Snap 3 show the display when user has commanded the instrument to continue the operation after alarm set by pressing the **UP** (↑) key.



Snap 1



Snap 2

Snap 3

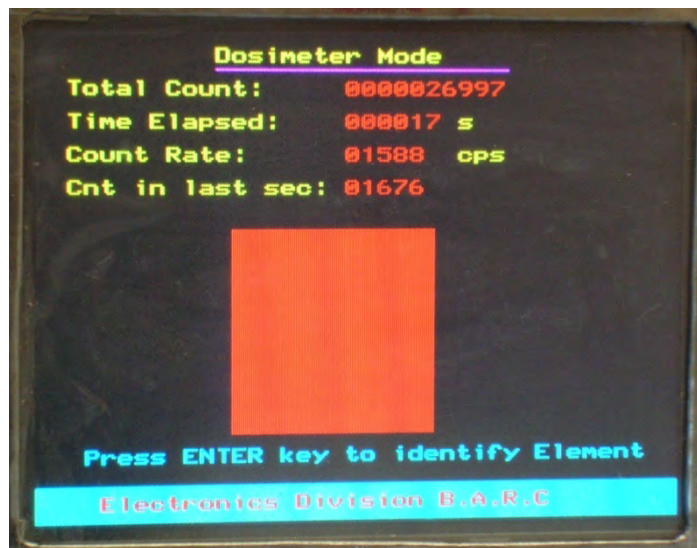


Figure 22 Working of Instrument in Dosimeter Mode

CHAPTER –VI

CONTACT US FOR AVAILING SERVICES

Postal/Mailing Address (Phone / Fax / Email)

Nucleonix Systems Pvt Ltd.
Plot No. 162 A&B, Phase II, I.D.A.,
Cherlapally, Hyderabad - 500 051, Telangana, India.
Phone: + 91-40-27263701, 040-27262146, 68888777
Mobile: 7331104480, 7331104481, 7331104482
Fax : + 91-40 - 27262146
Email : info@nucleonix.com

**For any information, Contact by email is always appreciated.
(This will help us to respond to you quickly)**

Marketing Department :

a) Sales / Commercial Information / Field installation and servicing

For any Commercial, Price information, Product information, customer coordination & quotation of our products customer related commercial services, please contact front office marketing staff through the listed Email Ids or Phone Nos. given below

Whom to Contact:

| Business Executives: | Contact Numbers | Contact by E-mail ID |
|--|---------------------------------|-----------------------------|
| 1. R.Maniram (Sr. Business Executive) | Mob:7331104481, Ph-040-27263701 | info@nucleonix.com |
| 2. Ch.Gayatri (Business Executive) | Mob:7331104481, Ph-040-27263701 | info@nucleonix.com |
| 3. K.Swapna (Business Executive) | Mob:7331104481, Ph-040-27263701 | info@nucleonix.com |

Note: Our business executives will also connect you to concerned Engineer or General Manager for any technical clarifications if required

b) Factory Services

For **Servicing and Calibration** factory services & follow up on the above jobs including dispatch related/payment related issues of serviced & calibrated items please contact

Ms. K.Sarika
(Executive services)

Mob:7331104482

E-mail: info@nucleonix.com

She will also connect you to concerned engineer or general manager if required, for any clarifications & deficiencies in services

c) Dispatch Related Issues (Production Items)

For dispatch related issues of your ordered equipments, including delays, purchase order related document deficiencies, payment proofs, dispatch docket details and bills etc.,contact

Ms.V.Anusha / Renuka
Devi (Executive Dispatch)

Ph:040-27263701, Ex-26

E-mail: info@nucleonix.com

d) Product Technical Information / Clarifications

Whom To Contact:

Contact any front office "Business Executive"- He/She will take your details and connect you to concerned product engineer for any technical clarifications. Best thing is to email your technical queries and obtain the reply, rather than on telephone.

You can also contact General Manager or Director (Tech) if required.

e) Marketing Manager

On business matters for all your marketing services / techno commercial requirements about Nucleonix Products contact:

Bhaskara I.V.

Mob:8019662500

Land lines : 91-40-27263701, 91-40-68888777

Email: info@nucleonix.com

f) General Manager

Dr.M.S.R.Murthy PhD (Nuclear physics)

Land line: 91-40-27263701, 91-40-68888777

Email: info@nucleonix.com

Contact General Manager for all sales / servicing and technical information including customer support related issues, on the delays, gaps & lapses by our staff. Contact G.M. regarding field installations & field servicing jobs schedule etc.

g) H.R -Incharge

Contact her regarding, job vacancies, sending resume for employment, H.R. related issues etc. contact

Ms. Shanthi Sri

Mob:7331104480

Email: recruit@nucleonix.com

h) Director -Technical

Mr. J. Dheeraj Reddy

Email: jdreddy@nucleonix.com

Mobile No :+91-7674009005

Contact him for, any Technical Information and clarifications on products, which cannot be answered by General Manager / Customer support executives.

For any technical deficiencies in products, related issues & suggestions on product improvements you may contact by email or telephone. This will help the company to improve the product & serve you better.

Dealer's complaints, on commercials, lapses by our commercial staff, or any other discrepancy, or you like to give any feedback on any Nucleonix staff doing any wrong thing against cleaner / ethical business principles / practices can be complained to any of the directors or managing director.

i) Director - IT

Mr. J. Nishanth Reddy

Email: nishureddy@yahoo.com; info@nucleonix.com

Mobile No. +91-9966691000

For any deficiencies in product software's, related issues, & any suggestions or improvisations in software's can be contact by email or telephone. This will help the company to improve the product & serve you better.

j) Managing Director

Shri. J.Narender Reddy (Managing Director)

Email : jnreddy@nucleonix.com; info@nucleonix.com

Contact Managing Director for, Foreign relations, International Business co-operation, Joint ventures, Exports, Dealership in other countries, Policy matters, Technology tie-ups etc.

k) Dealers Complaints :

Dealers complaints, on commercials, lapses by our commercial staff, or any other discrepancy, or you like to give any feedback on any Nucleonix staff doing any wrong thing against cleaner / ethical business principles / practices can be complained to any of the directors or managing director.

**An innovative company working towards excellence in the
field of Nuclear Instrumentation**



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