PRESENTATION ON G.M COUNTING SYSTEM

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G.M COUNTING SYSTEM

FRONT VIEW OF G.M COUNTING SYSTEM (AT) TYPE : (GC602A)

REAR VIEW OF G.M COUNTING SYSTEM (AT)

1) INTRODUCTION

- Geiger-Muller Counting System (AT) Type : GC602A manufactured by NUCLEONIX SYSTEM is a versatile integral counting system designed around eight bit micro controller chip. This system is highly recommended for research work.
- This Counting System is an essiential tool for counting Beta activity in radioactive samples in

- Nuclear Research Institutes
- Atomic Power Stations.
- Reprocessing Plants etc.
- Radiation Physics & Radio Chemistry experiments in academic institutions, Universities etc.

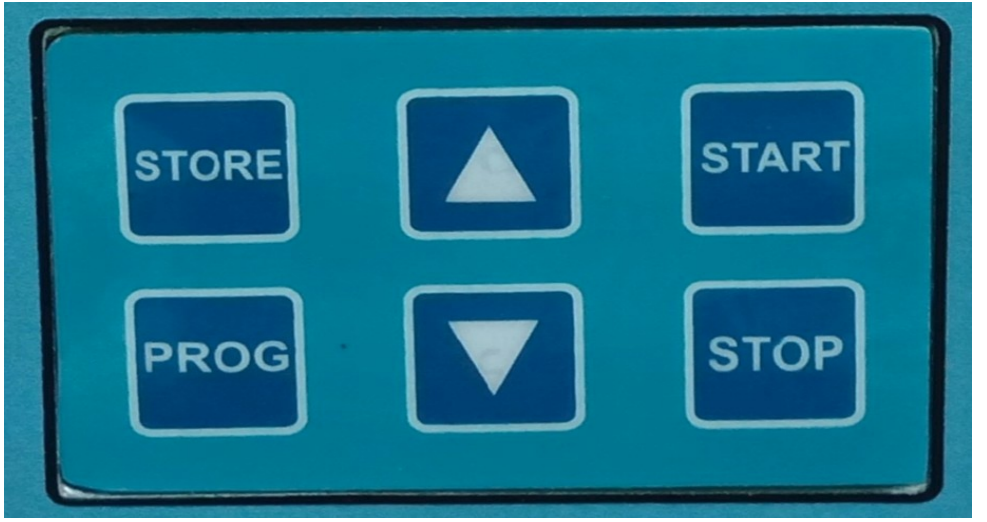
2) FEATURES

Some important features of this unit are :

- State of art microcontroller based design.
- 20 X 2 LCD dotmatrix display for counts, elapsed time and EHT
- Counts capacity 999999, Preset time 9999 sec
- Variable EHT (0-1500V), 1 mA

3) FRONT PANEL CONTROL AND INDICATIONS.

Front Panel



Keypad

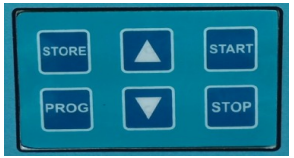
FRONT PANEL CONTROL AND INDICATIONS.

- POWER ON SWITCH :-

  This is a miniature ROCKER switch which is used to power ON the unit. When the switch is put 'ON' power is made available to the unit through +12V adaptor.

  EHT-Extra High Tension (0-1500V) :-

  This is a knob to be rotated in the clockwise direction for increasing HV that is applied to the G.M.Detector.



- INTELLIGENT KEYPAD :-

  (a) PROG key button : This key facilitates the user to programme the operation of the instrument is different modes / conditions.

  (b) START key button : This is used for starting of acquisition and printing, after all the programme parameter have been set.

  (c) STOP key button : This key is to terminate acquisition and printing inbetween. In the normal course acquisition will stop automatically at the end of preset time.

  (d) INC/DEC key button : These keys are used for setting the programme parameters to increment and decrement a value

  (e) STORE key button : This key is used for storing the readings or data values , in the manual mode of storinga at the end of acquisition for a preset time, if user presses this button, data counts with or without EHT will be stored and the Sl.No. in the display increments to the next value.

- LCD DOTMATRIX DISPLAY :-

  This is a 20 X 2 alpha numeric LCD dotmatrix and responds to all the commands from the keypad and displays programme parameters, current HV, data counts, serial number, preset and elapsed times.

REAR PANEL CONTROLS AND INDICATIONS

- +12V ADAPTOR SOCKET

  This is a low voltage socket for power supply.

- G.M.DETECTOR

  This is a MHV (Miniature High Voltage) socket, GM detector mounted in the G.M.stand gets connected here through MHV-MHV cable.

- TO PRINTER

  This is a 25 pin D-female connector through which one can connect a printer (with centronics interface cable) for direct printing of data.

- USB

  This is a USB connector used for data communication with PC.

4) SPECIFICATIONS

- G.M.Input (From G.M.Counter)

  (a) Polarity : Negative

  (b) Amplitude : 500 mV (min)

  Resolving time : 6 micro sec (approx)
- EHT output : Variable EHT using ten turn pot upto a maximum of 1500 volts at 1 mA.
- Display : 20 X 2 LCD dotmatrix display to indicate data counts, Elapsed time and EHT
- Counts capacity : 999999 counts
- Preset time : 0 - 9999 seconds
- Data storage : Upto 6665 readings
- Command Buttons : START, STOP, PROG, STORE, INC & DEC

SPECIFICATIONS

- Programmability : Includes selection of preset time, starting and stoping of acquisition, lable assignment for data counts, BG (Background), ST (Standard) and SM (Sample).
- G.M.Socket : MHV connector for connecting to G.M.Detector.
- Printing option : Built -in parallel port for data printing
- Data Transfer : Built -in USB serial port for downloading the data into PC
- Power : +12V adaptor about 1.4A at 230V at 50 Hz

Accessories for Beta Counting Application

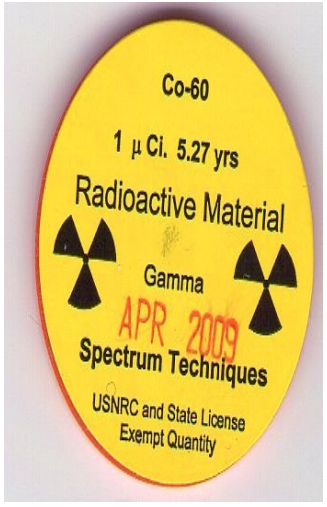
The following accessories are required for the unit, for Beta Counting Application.

- a) End Window G.M.Detector Stand Type : SG200

- b) End Window G.M.Tube Type : GM 120 (or) GM125

ACCESSORIES for Beta Counting Application

c. Radioactive Source Kit Type : SK210



Co- 60

Ba-133

Cs-137

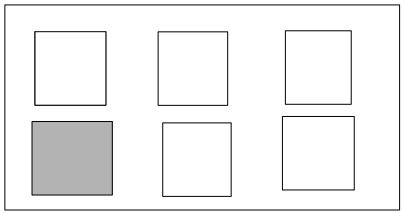
Na-22

SR-90

5) INTERCONNECTIONS AND CONTROLS

Connection from	Connection to	Remarks cable to be used
+12V adaptor		+12V adaptor cable
G.M. Detector MHV Socket on Rear Panel of GC602A	MHV Socket on G.M.Stand	MHV to MHV cable
Personal computer serial port	USB connector on Rear Panel of GC602A	USB serial cable
Printer (Optional)	Printer Connector on Rear Panel of GC602A	25 pin D to D connector printer cable

ACQUISTION MODE SELECTION

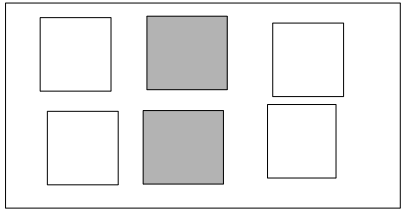


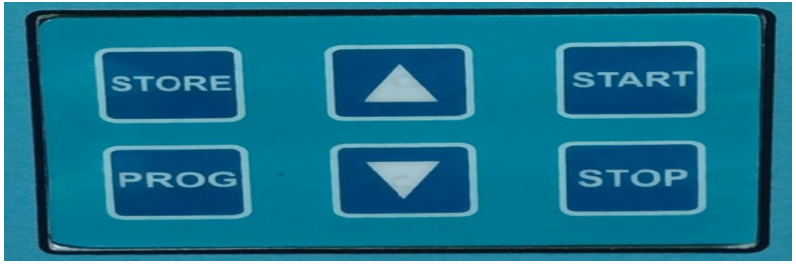
ACQ MODE	HV
PR.TIME	XXXX

By default "acquistion is in preset time mode".

For other modes of acquistion such as CPS (Counts per second) or CPM (Counts per minute) then press increment or decrement keys to select required mode or else proceed as follows.

Always displays the current HV. We can vary the HV by using helipot knob on the front panel. As you turn the knob in clockwise direction HV increases. This is the HV that is applied to G.M. detector.



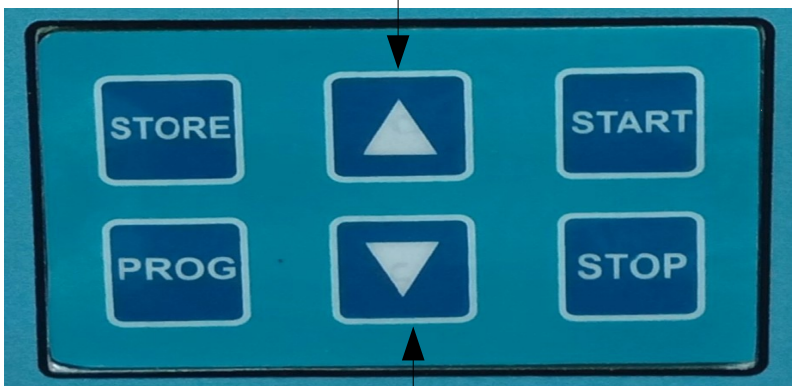


PRESET TIME SETTING

- By pressing PROG key, display changes to Cursor position

PRESET		HV Voltage
TIME	XXXX	XXXX

Increment Key can be used to increase the value at the cursor position



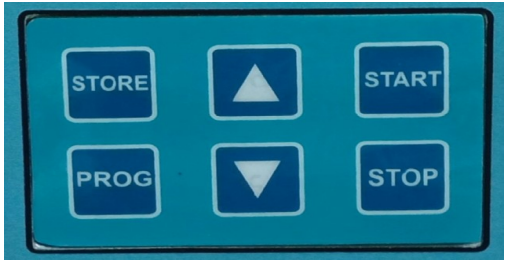
Decrement Key can be used to shift the cursor position to the left.

PRESET TIME SETTING

Normal use. One can keep pressing "PROG" key till you find
"SAVE ? (PRG)"

Once programme parameters are saved user will find the display as

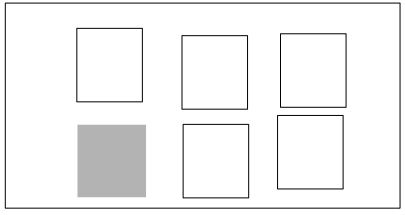
SAVE ? (PRG)	HV
OK	XXXX

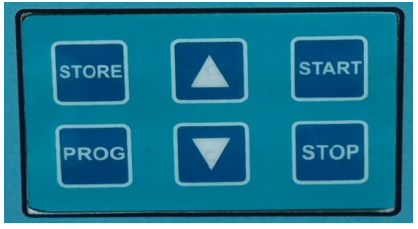


NUMBER OF READINGS

This displays the number of Readings during acquistion and also display the HV.

By pressing PROG key again display changes to,





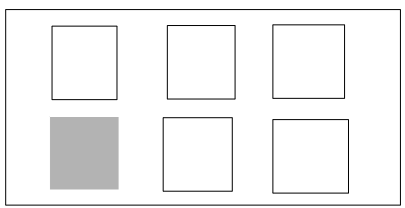
Reading	HV
XXXX	XXXX

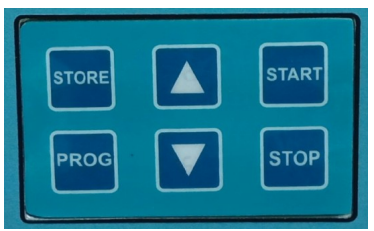
LABLE ASSIGNMENT FOR A DATA READING

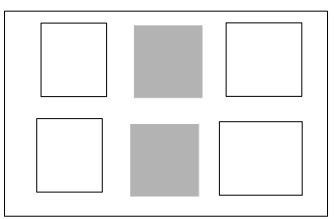
Lable Assignment will record background count, a reading with standard source and followed by this number of readings with different samples.

BG = Background
ST = Standard
SP = Sample

Before acquisition for each reading, lable is to be assigned.
By pressing PROG key, display changes to,







Lable	XX	HV
		XXXX

XX :
Lable can be changed by using increment or decrement keys, options are SP

OPERATING PROCEDURE

FOR BETA COUNTING APPLICATION

- Make the interconnections of the unit.
- Before switching ON please ensure that the G.M. Detector is mounted inside the G.M.Stand and interconnections are made between the detector. Wrong connections will damage the G.M. tube permanently.
- Ensure before switching ON, that EHT knob is in anti-clockwise position completely, so that HV applied is almost zero volts.
- Now place a radioactive source in the source tray and increase the HV after switching ON the unit.
- Notice that HV value will be displayed on the dot matrix display.
- Now go through the instructions "Instructions on intelligent keypad commands". Having practiced the commands on keypad,we can carryout the sample counting etc., we can set the HV bias to 'operating voltage' of the detector and use it for sample counting.

Experiments with GM Counter

1) Study of characteristics of GM Tube and determination of its operating voltage, plateau length / slope etc.

2) Verification of Inverse law for gamma rays.

3) Study of Nuclear Counting Statistics.

4) Estimation of Efficency of the G.M. detector for

(a) Gamma source (b) Beta Source

Thank You