

# INSTRUCTION MANUAL

## DIGITAL POCKET DOSIMETER-I



TYPE: PD 714

## NUCLEONIX SYSTEMS PRIVATE LIMITED

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FILE NAME : NSPL/DOC / MAN / PD714/01

VER\_20170623



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## CHAPTER - I

### INTRODUCTION

**Digital Pocket Dosimeter –I type PD714** manufactured and supplied by NUCLEONIX SYSTEMS uses Si-diode as the radiation detector. Pulsed output from this detector is amplified suitably. These signals are processed through a microcontroller based hardware, which under the control of embedded code processes these signals, counts them for a time constant, computes to display the readings in **cumulative dose** or **dose rates**, as selected by the user.

Visual display is a custom designed LCD with driver having Four digit indication with appropriate decimal & unit selection indication. Extensive use of SMD devices has made this unit compact in size. Unit is powered by standard coin cell battery & has a life of 500 hours (Approx).

#### FEATURES:

- Si-diode is used as the radiation detector.
- Compact, elegant & light weight.
- Energy flat response above 60 KeV to 1.20 MeV.
- Readout accuracy within +/-15%. With Cs-137
- **Cumulative dose** in the range of 1 $\mu$ Sv to 999.9mSv
- **Dose rate** in the range of 00.01 – 999.9mSv/hr
- Powered by standard coin cell battery to give long life of 500 hours (approx).
- Built-in IR port, for connecting it to personal computer (PC) through Docking Station supplied by Nucleonix System for programmability & use with Dose records data management software.

## CHAPTER - II

### FRONT PANEL CONTROLS & INDICATIONS

#### DIGITAL POCKET DOSIMETER



#### FRONT PANEL CONTROLS AND INDICATIONS:

**LCD DISPLAY:** A compact custom LCD display has been used for display of cumulative dose and doserate.

**KEYPAD:** A single push button switch is used to make the dosimeter ON/OFF or for selection of doserate mode. Press and hold switch when unit is OFF for about 5 seconds to turn it ON. Release switch after the unit initialization is complete.

**LOW BATTERY INDICATION:** The instrument shows “ Low Bat ” on LCD when the battery goes low.

## CHAPTER - III

### SPECIFICATIONS

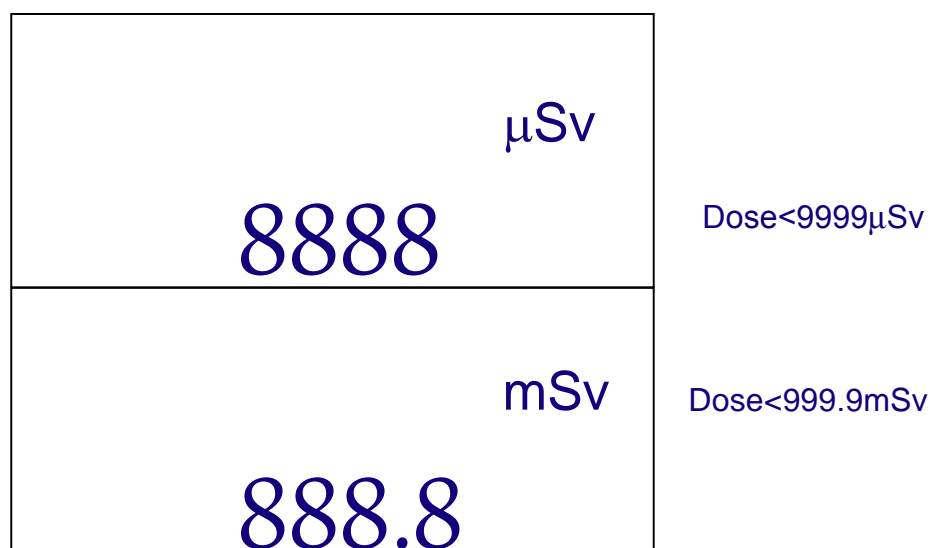
<b>Radiation Detected</b>	: X & Gamma Radiation (>40KeV)
<b>Detector Used</b>	: PN junction Si conductor
<b>Cumulative Dose</b>	: <b>1 to 9999 <math>\mu</math>Sv</b> in low range and 10.00mSv–999.9mSv in high range
<b>Doserate range</b>	: 00.01 – 999.9mSv/hr
<b>Energy dependence</b>	: Within +/- 30% from 60 KeV to 1.2MeV
<b>Readout Accuracy</b>	: Within +/-15% for $^{137}\text{Cs}$ , upto 999.9mSv/h
<b>Operating Environment</b>	: 0 - 45 °C; 90% RH (non-condensing)
<b>Battery</b>	: CR2354 coin cell battery
<b>Battery Life</b>	: Continuous use of 500 hrs (Approx.)
<b>Sensitivity</b>	: 0.2 cps/mR/hr
<b>Display</b>	: 4 Digit LCD
<b>Keypad</b>	: A single momentary switch is provided for reading doserate, power ON & power OFF.
<b>Dimensions</b>	: 31.5(W) x 124(L) x 14.5(D) mm excluding clip
<b>Weight</b>	: Approximately 60 gm.
<b>Low Battery Indication</b>	: “Low Bat ” which is displayed on Top of the display”
<b>Applications</b>	: Highly recommended for personal monitoring in Nuclear power plants, Radiotherapy departments, and Nuclear Medicine centre & at other Nuclear installations.

## CHAPTER IV

### OPERATING INSTRUCTIONS

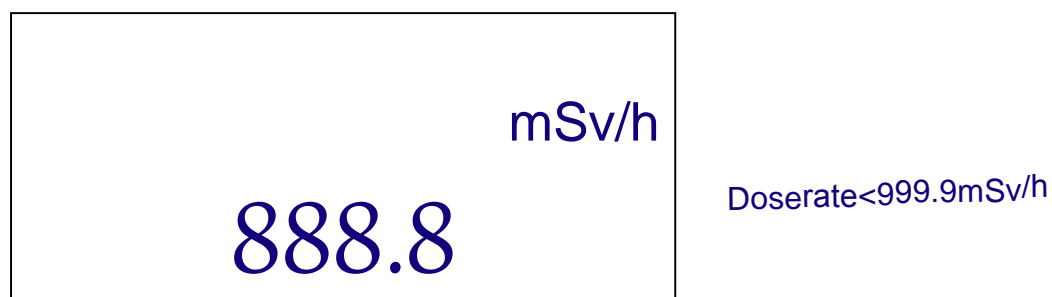
#### 4.1 CUMULATIVE DOSE MEASUREMENT DISPLAY & RANGE CHANGEOVER

The pocket dosimeter PD714 measures cumulative dose in range from  $1\mu\text{Sv}$  to  $999.9\text{mSv}$



#### 4.2. DOSERATE MEASUREMENT DISPLAY & RANGE CHANGEOVER

The pocket dosimeter measures doserate continuously and is shown on the LCD display if the read button is pressed momentarily for a second. It measures doserate in the range of  $00.01 - 999.9\text{mSv/hr}$  in single range





### 4.3 HOW TO SWITCH ON AND USE?

- (a) For manual method of using for individual users without docking station.



To switch ON the equipment press the **Fn** key for 1 sec where the arrow is pointed to



To switch OFF the equipment press the **Fn** key for 5 secs where the arrow is pointed to



To check the measurement in DoseRate mode press **Fn** Key for 1 Sec.

- (b) For method of switching ON manually by pressing **Fn** key and for switching it OFF through software & through Docking station, refer to 'Software tools provided by Nucleonix systems' or contact Customer Support Division by email.

## CHAPTER - V

### 5.1. MAINTENANCE AND WARRANTY CLAUSE

As per the warranty clause of the company we provide one-year warranty during which period we provide free service at our works. Hence in case of any mal-function in our instruments you are requested to send the unit back to our works by RPP/COURIER/SPEED POST PARCEL/GATI/XPS/door delivery. We shall arrange immediate rectification/replacement within two weeks from the date of receipt of the equipment at our place. Please note that the equipment will be serviced at our works only. Incase of physical damage, breakage of tampering or breaking or breaking of warranty seal or unauthorized opening & repairs on our circuit this one year warranty is void. Warranty is not applicable for cracks or breakage in LCD displays.

The equipment is to be sent to:

The Servicing Department  
NUCLEONIX SYSTEMS PRIVATE LIMITED  
Plot No: 162 A & B, PHASE II,  
I.D.A. Cherlapally,  
Hyderabad - 500 051

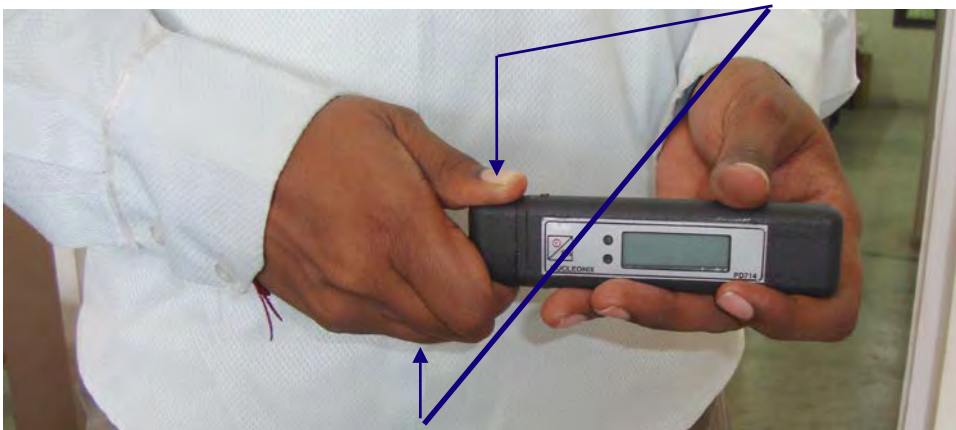
**Note:** In respect of all types of Pocket Dosimeters, it may be necessary to checkup and recalibrate the equipment once a year at our works. Please send it to our works for recalibration.

## 5.2. HOW TO REPLACE BATTERY:

When you observe battery low voltage indication “ Low Bat ” on top of LCD display, it is advised that the battery be replaced to ensure validity of calibration and indication of correct dose / doserate.

The following procedure is to be observed for the replacement of the battery.

- i. A separate battery compartment is provided on the bottom side (when inserted into pocket) of the pocket dosimeter.
- ii. Hold the battery cap & press it slightly & Pull-out the end cap, gently to see the coin cell sitting inside the slot.
- iii. Take out the coin cell & replace with fresh coin cell battery (3V) ensuring proper polarity.
- iv. Replace the battery cover.
- v. Press the cap slightly & pull it out      Now it is ready for use.



## CHAPTER - VI

### CALIBRATION

Each of the Pocket Dosimeters are authentically calibrated using CRC2 Camera.

#### Cumulative dose:

Time	Dose Rate Exposure	Cumulative Dose	
		Expected	Observed

Calibrated by: \_\_\_\_\_

Calibration Date: \_\_\_\_\_

Instrument SI.No.: \_\_\_\_\_

Calibration Due: \_\_\_\_\_

## Calibration Procedure at Customer Site

- Expose the units of calibration for 1R/hr distance for 1hr or 2R/hr distance for 1/2hr.
- After the calibration is done note down the readings & then switch “OFF” the unit & Insert the dosimeter on IR docking station & switch “ON” the unit.
- Once the unit communicates with the system then load the calibration factor depending upon the value that was displayed on the display before switching off the unit.
- Calibration factor can be calculated as followed.

Expected dose	10000 $\mu$ Sv
Observed dose	y
Let calibration factor	Z
Expected calibration factor	X

- Expected calibration factor  $(X) = 10000 \times Z / y$
- After calibration factor is calculated that number should be loaded using either software or hyper terminal.
- After loading the calibration factor, again the unit should be calibrated.

## CHAPTER – VII

### IR DOCKING STATION

IR Docking Station DS715 under the control of the PC communication software, primarily facilitates automatic readout of **Cumulative Dose** along with the **Unique ID** apart from **configuration/calibration** of the dosimeter. The Docking station communicates with the Dosimeter through IR port at a baud-rate of 1200. On the PC side it gets connected through the USB port. Docking station derives power through the USB port.

PC communication software is designed to read total dose from the dosimeter automatically once the dosimeter is placed on the docking station. To assigning Unique ID for individual dosimeters, Calibration of the dosimeters for Cumulative Dose. The Application software routes data to Dosimeter through virtual comm. port to Docking station which in turn routes the data through IR port to the Dosimeter. Once the data is retrieved into PC, it gets recorded in a database. Users can retrieve and analyze data - ID-wise, Day-wise, Month-wise, Week-wise.



## FEATURES

### Hardware:

- ☐ Communication with dosimeters over IR port
- ☐ Connects to PC through USB port

### Software:

- ☐ Automatic cumulative dose & ID readout
- ☐ Facilitates configuration of alarm settings and dose calibration
- ☐ Data storage automatically after each readout.

## CHAPTER – VIII

### DOSE TICKET RECORDS MANAGEMENT SOFTWARE HELP DOCUMENT

#### INTRODUCTION

Nucleonix dosimeters – Pocket/Pen/Waist belt type are used by Radiation personnel working in nuclear plants, Nuclear Medicine centers, Nuclear Research institutions and other Nuclear facilities to electronically record the absorbed radiation Dose. Dosimeters are issued on daily basis and collected back at the end of the day.

This system facilitates the issue and return of Dosimeters to Employees/Contract workers/Visitors, downloading Dose data from Dosimeter to PC and storage in Dose Records database for each user. Dose Records Data Management software generates various types of Reports.

#### SYSTEM REQUIREMENTS:

PC (Minimum configuration): Intel i3 CPU or better, 2 GB RAM, 160 GB HDD.

OS: Windows 7 (**32 bit**). (Windows Vista / XP is not supported)

Antivirus: Norton / Quickheal / Kaspersky

Internet connectivity & Teamviewer/Skype software: For remote trouble-shooting

#### INSTALLATION:

To install the software, execute DoseTicket.bat in the installation CD. Follow instructions in README\_DoseTicket file. Click through the options, until you get the message that installation is completed successfully.

In case of any errors, please take a screenshot of the error message and email to Nucleonix Customer Support.

#### MAKING CONNECTIONS AND IDENTIFYING COM PORT:

Ensure that the USB drivers are installed by DoseTicket.bat file. Connect the Docking station to PC. For establishing communication with the Electronics, COM port number corresponding to this Docking Station must be identified.

To do this, Right click on "My computer" icon on Desktop. Select Properties -> Device Manager -> Ports. You will find the COM port number. For eg. If you find „COM3“, it means that COM port number is 3. Enter the COM port numbers in DoseTicket\_Config.txt.

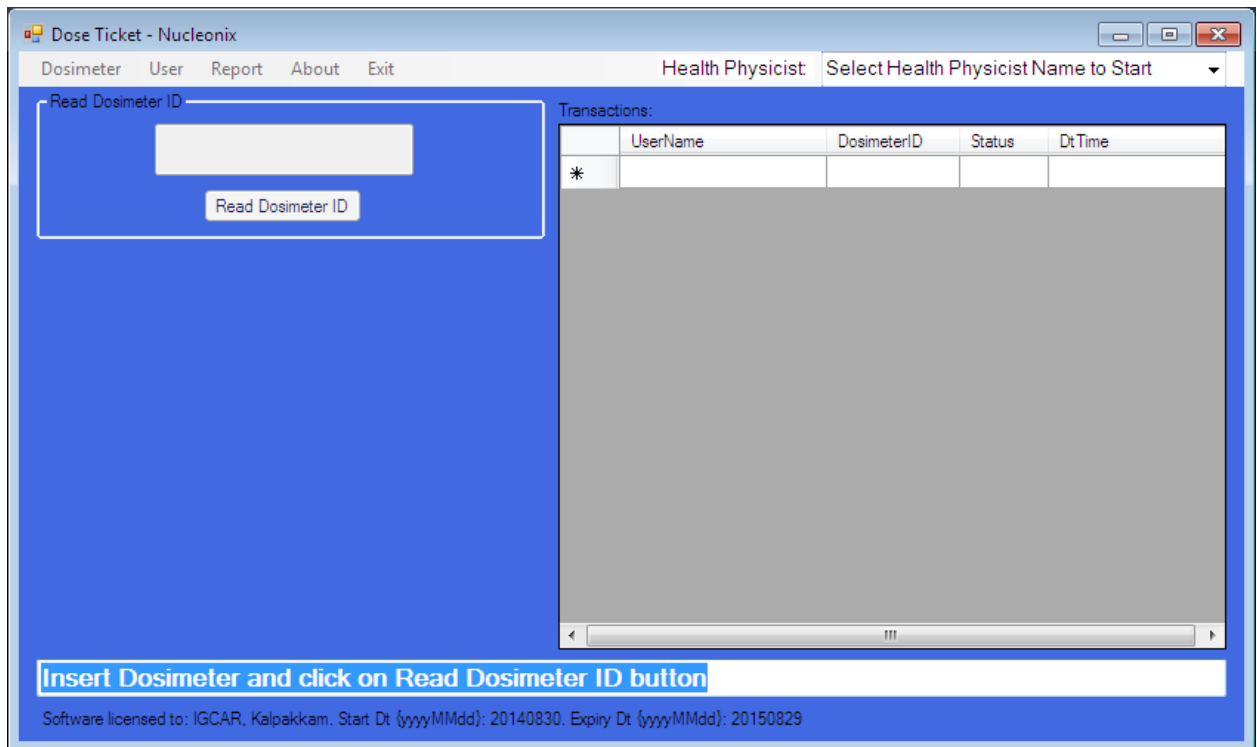
#### ENTERING HEALTH PHYSICIST NAMES:

Open d:\DoseTicket\_HealthPhysicists.txt and enter the names of Health Physicists.

#### EXECUTING THE APPLICATION:

Click on Start -> Programs -> Nucleonix Systems -> DoseTicket or Double click DoseTicket icon on Desktop to run the application. The main screen of DoseTicket shows up as below:





Select the Health Physicist name from Dropdown. This will enable the Main Menu and 'Read Dosimeter' button.

### Main Menu:

It consists of Dosimeter, User, Report, About, Exit menu items.

### Issuing/Returning a Dosimeter:

To Issue/Return a Dosimeter, insert the dosimeter into the Docking station and click on 'Read Dosimeter ID' button. The 10 digit Dosimeter ID is read & displayed in the Text box. In case incorrect ID is displayed or no ID is read, ensure that the dosimeter is ON, re-insert the Dosimeter and click on the 'Read Dosimeter ID' button again.

Based on the previous 'Status' of Dosimeter, whether it was issued or returned, the appropriate fields appear on the screen. For a Dosimeter that was 'Returned', the screen will look like the one below:

**Dose Ticket - Nucleonix**

Menu: Dosimeter User Report About Exit

Health Physicist: Kiran

Read Dosimeter ID: 001234567890

Read Dosimeter ID

Transaction: Issue Dosimeter

☐ Create New User & Issue Dosimeter

User Name: [ ] Search

TLD Number: [ ] Search

Emp ID: [ ] Search

Issue Dosimeter

Transactions:

	UserName	DosimeterID	Status	Dt Time
*				

Enter User details and Issue Dosimeter.

Software licensed to: IGCAR, Kalpakkam. Start Dt {yyyyMMdd}: 20140830. Expiry Dt {yyyyMMdd}: 20150829

To assign the Dosimeter to a User, who is already in the database, type User Name / TLD Number / Emp ID and click on Search button. Then, click on 'Issue Dosimeter' button. The transaction is displayed in the Grid on right.

To assign the Dosimeter to a New User, click on the Check box 'Create New User & Issue Dosimeter' and enter the new User details. Select the appropriate User Type – Employee / Contract Worker / Visitor / Administrator.

**Dose Ticket - Nucleonix**

Menu: Dosimeter User Report About Exit

Health Physicist: Kiran

Read Dosimeter ID: 001234567890

Read Dosimeter ID

Transaction: Issue Dosimeter

☒ Create New User & Issue Dosimeter

User Name: J Nishanth Reddy

TLD Number: 12345678901234567890

Emp ID: A10

User Type: Employee

Create User & Issue Dosimeter

Transactions:

	UserName	DosimeterID	Status	Dt Time
*				

Enter User details and Issue Dosimeter.

Software licensed to: IGCAR, Kalpakkam. Start Dt {yyyyMMdd}: 20140830. Expiry Dt {yyyyMMdd}: 20150829

Then click on 'Create New User & Issue Dosimeter' button. The screen appears as below:

**Dose Ticket - Nucleonix**

Dosimeter User Report About Exit

Health Physicist: **Kiran**

Read Dosimeter ID

Read Dosimeter ID

Transactions:

	UserName	DosimeterID	Status	Dt Time
▶	J Nishanth Reddy	001234567890	Issued	08/30/2014 14:59:02
*				

**New User created and Dosimeter issued. Insert next Dosimeter.**

Software licensed to: IGCAR, Kalpakkam. Start Dt {yyyyMMdd}: 20140830. Expiry Dt {yyyyMMdd}: 20150829

To return the dosimeter, insert the dosimeter in Docking station & click on 'Read Dosimeter ID' button. The screen looks like below:

**Dose Ticket - Nucleonix**

Dosimeter User Report About Exit

Health Physicist: **Kiran**

Read Dosimeter ID

001234567890

Read Dosimeter ID

Transaction: Return Dosimeter

Dose: 000000

Remarks

Return & Exit Return & Print

Transactions:

	UserName	DosimeterID	Status	Dt Time
▶	J Nishanth Reddy	001234567890	Issued	08/30/2014 14:59:02
*				

**Enter Remarks and Return Dosimeter.**

Software licensed to: IGCAR, Kalpakkam. Start Dt {yyyyMMdd}: 20140830. Expiry Dt {yyyyMMdd}: 20150829

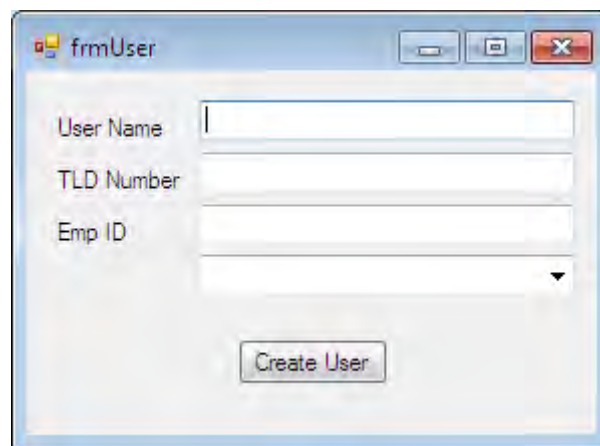
The Health Physicist can enter the remarks & click on either 'Return & Exit' button or in case Ticket printing is required, 'Return & Print' button can be clicked. The dosimeter's Dose value is nullified & it is automatically powered off upon Returning.

This way, Issue & Return transactions can be done. All the transactions are stored in the Database.

### User Menu:

New user can be created at the time of issue of Dosimeter. Alternatively, new user can be created from this menu.

To create a New user, click on this menu. A popup window appears as below:

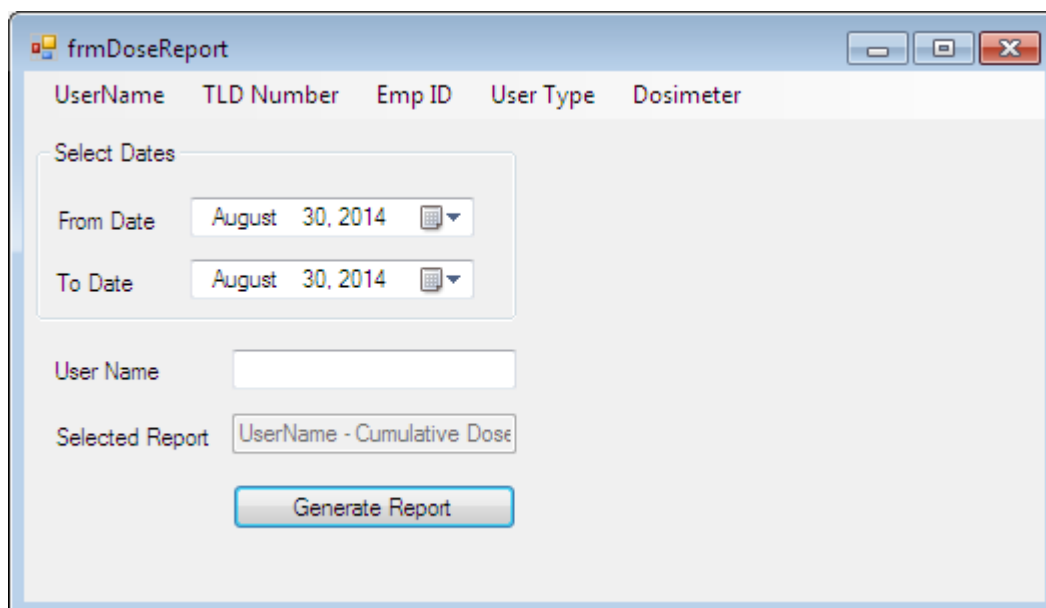


The screenshot shows a Windows-style window titled 'frmUser'. It contains three text input fields labeled 'User Name', 'TLD Number', and 'Emp ID'. Below the 'Emp ID' field is a dropdown arrow. At the bottom center of the window is a button labeled 'Create User'.

Above details need to be entered to create a new User.

### Report Menu

Various types of reports can be generated, as shown below:



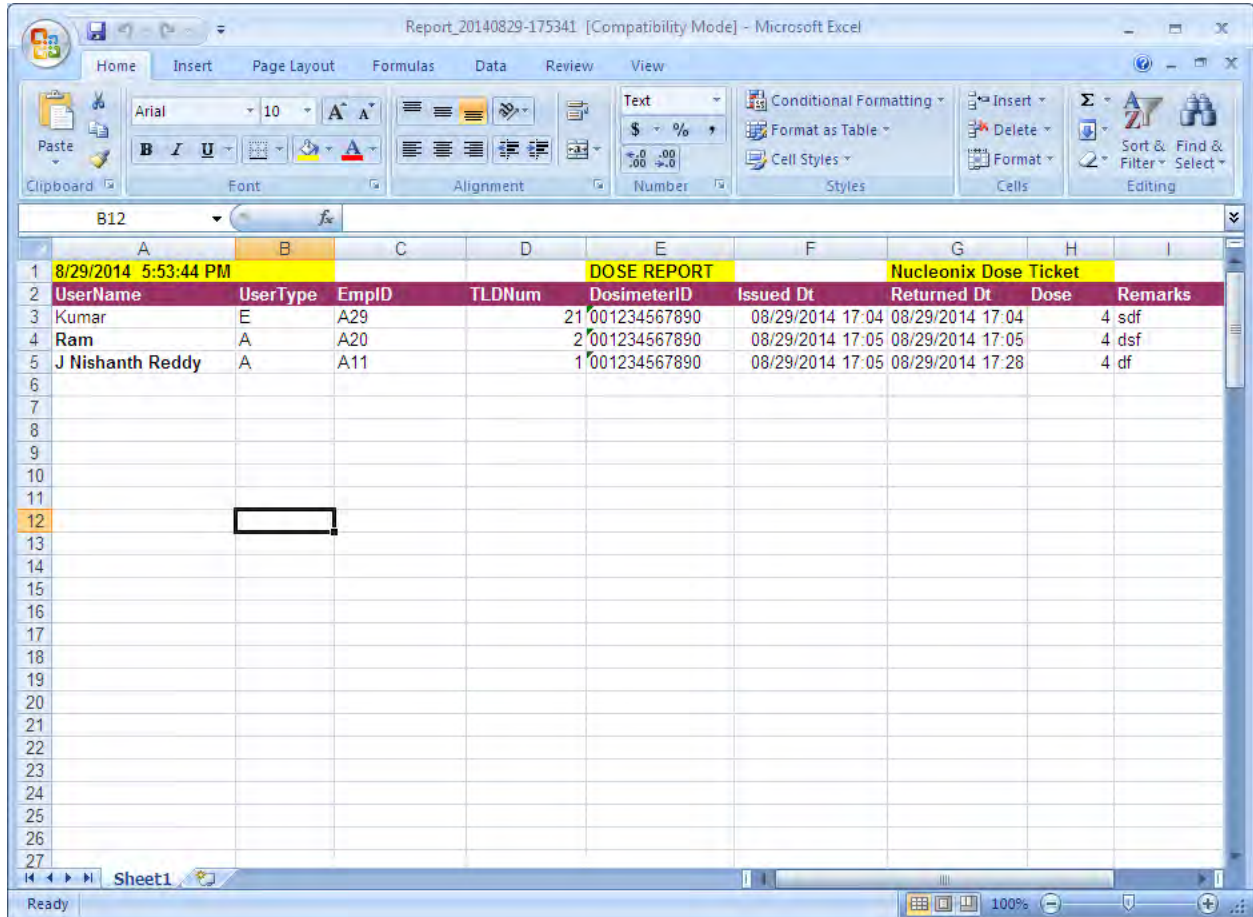
The screenshot shows a Windows-style window titled 'frmDoseReport'. At the top, there is a header row with the labels 'UserName', 'TLD Number', 'Emp ID', 'User Type', and 'Dosimeter'. Below this is a section titled 'Select Dates' containing two date pickers: 'From Date' and 'To Date', both set to 'August 30, 2014'. Below the date section is a 'User Name' text input field and a 'Selected Report' dropdown menu currently showing 'UserName - Cumulative Dose'. At the bottom center is a button labeled 'Generate Report'.

- a. 'Cumulative Dose' / 'Last transaction' / 'All Transactions' Reports based on UserName / TLD Number / Emp ID.

- b. 'All Transactions' Report based on User Type & Dosimeter ID.
- c. Pending / Lost / Under Maintenance report based on Dosimeter ID

These reports can be generated for a certain period by entering starting & ending dates.

A typical report is shown below:



8/29/2014 5:53:44 PM		DOSE REPORT				Nucleonix Dose Ticket		
UserName	UserType	EmpID	TLDNum	DosimeterID	Issued Dt	Returned Dt	Dose	Remarks
Kumar	E	A29	21	001234567890	08/29/2014 17:04	08/29/2014 17:04	4	sdf
Ram	A	A20	2	001234567890	08/29/2014 17:05	08/29/2014 17:05	4	dsf
J Nishanth Reddy	A	A11	1	001234567890	08/29/2014 17:05	08/29/2014 17:28	4	df

## Dosimeter Menu

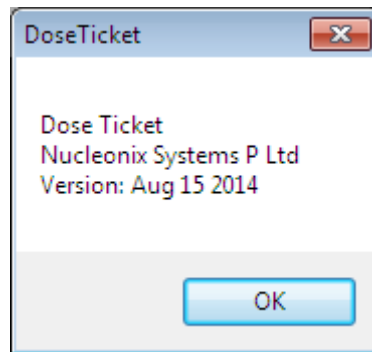
Dosimeter Menu can be used to set/read Dosimeter ID, Preset Dose level, Preset DoseRate level, Calibration Factor.

'Turn Off Dosimeter' can be used to nullify the Dose value stored in Dosimeter & power it off.

'Set Dosimeter Status' can be used to set the Status of Dosimeter to Lost / Under Maintenance / Returned. This does not require the Dosimeter to be inserted in the Docking station.

## About

Clicking on About shows the version of this software. Please check with Nucleonix Customer support for any updates or bug fixes. For AMC subscribers, free updates are sent whenever they are available.



**Exit**

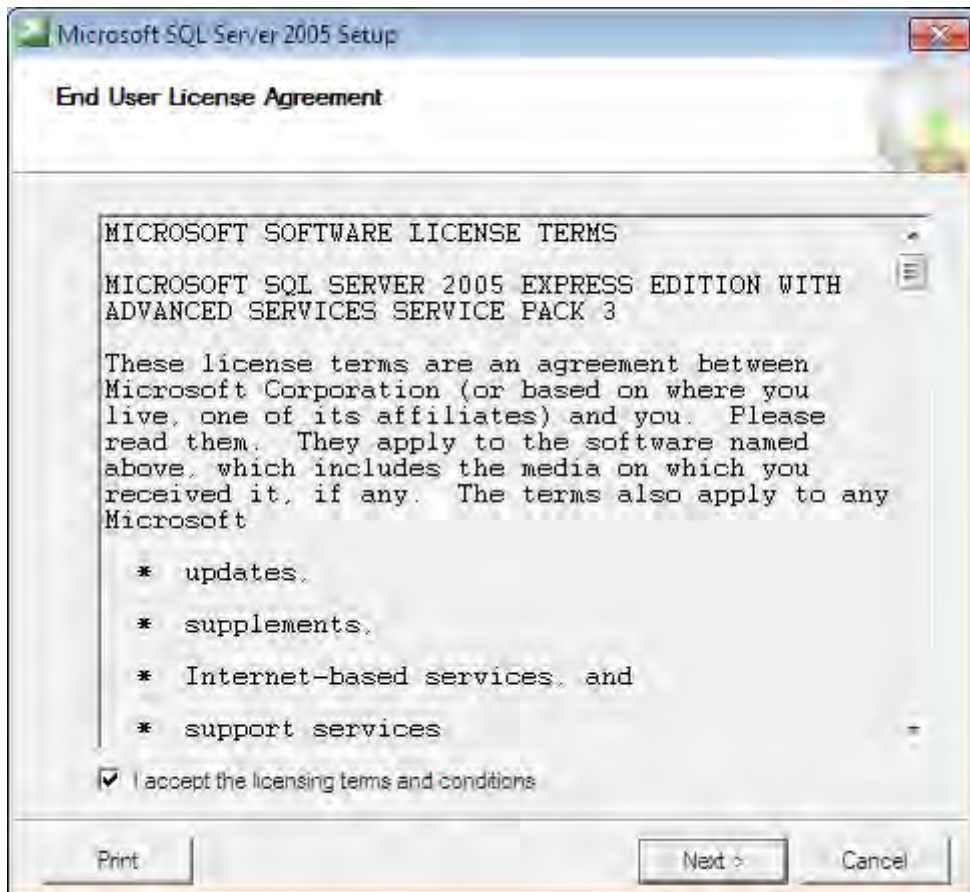
Click on this to end the application.

**Procedure for installing MS SQL Server Express 2005 – Nucleonix**

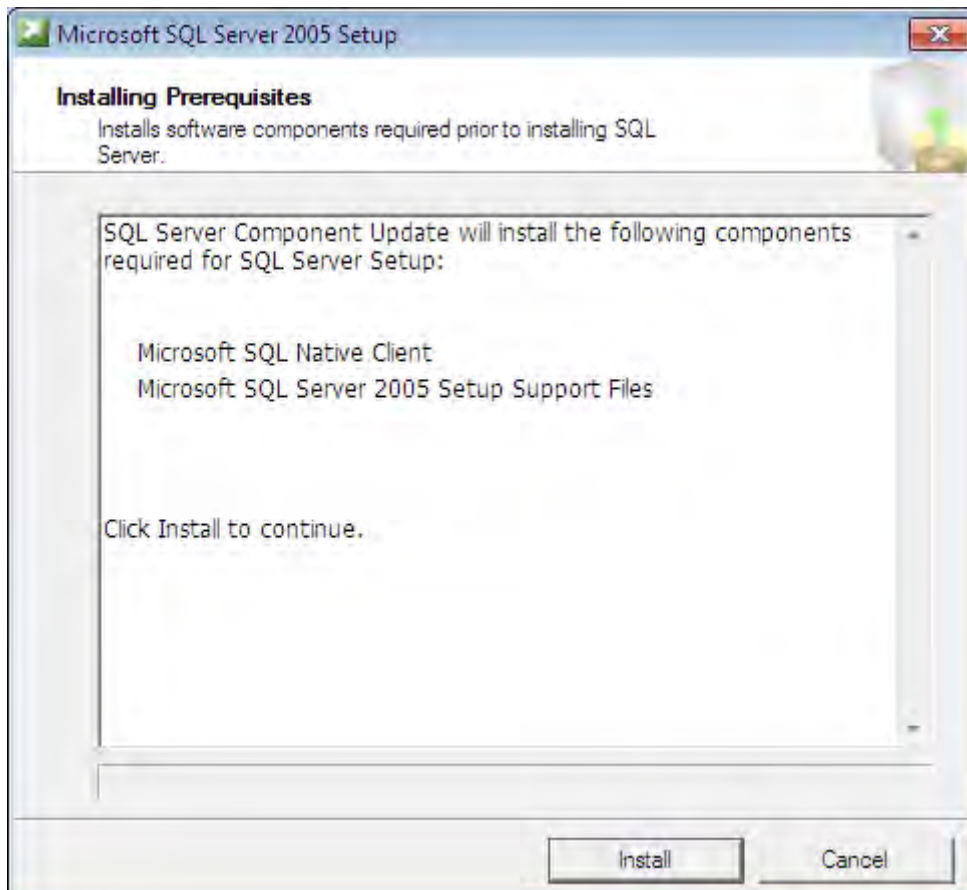
Saturday, August 30, 2014

**INSTALLATION OF MS SQL SERVER 2005 EXPRESS:**

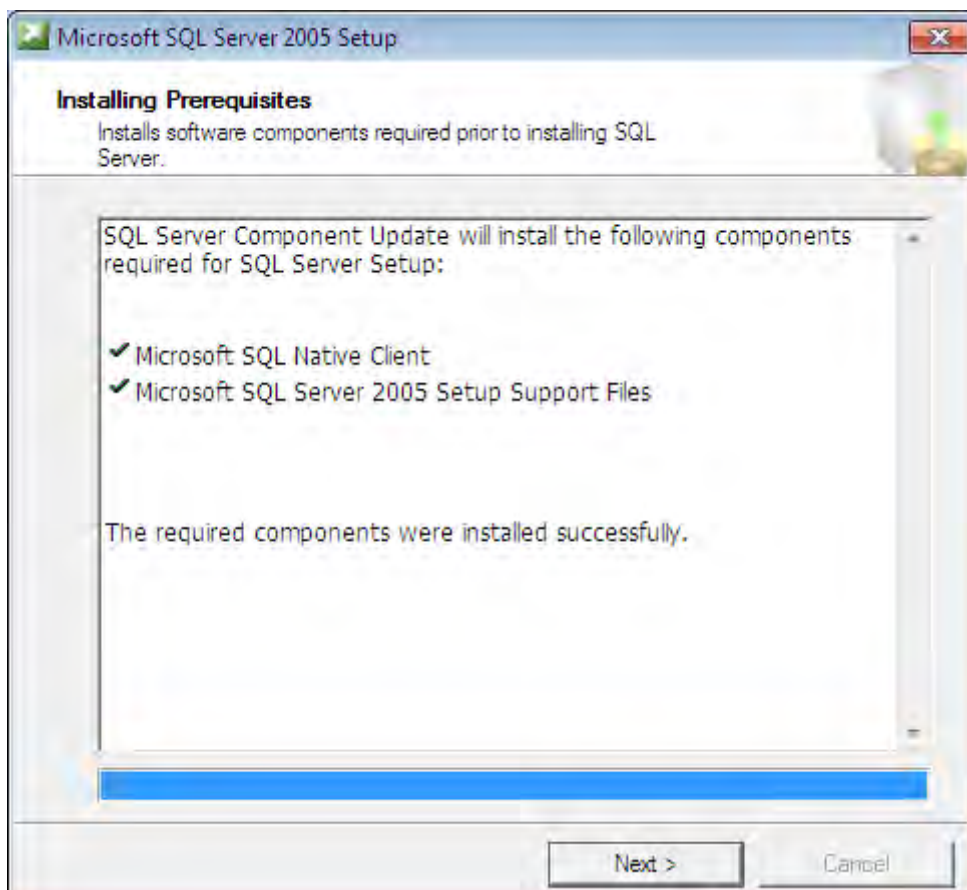
From the installation CD, run the '**SQLEXPR\_ADV.exe**' to start installing MS SQL Server Express 2005. The below window pops up.



Click on the Checkbox to accept the licensing terms and conditions. Then click on Next button.

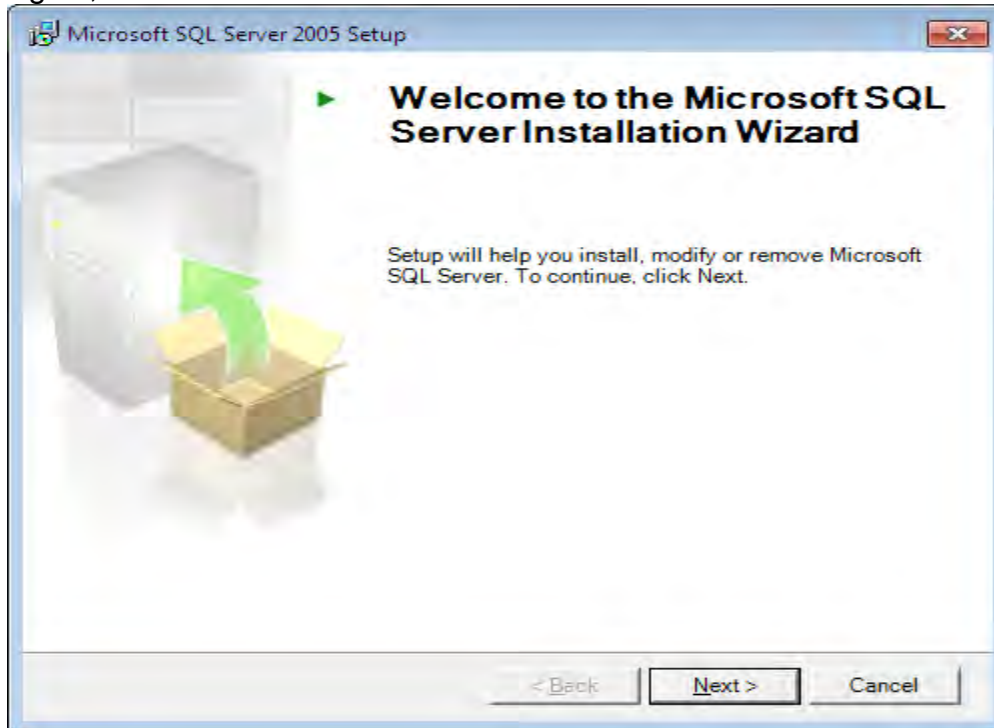


Click on Install button. The below window pops up:

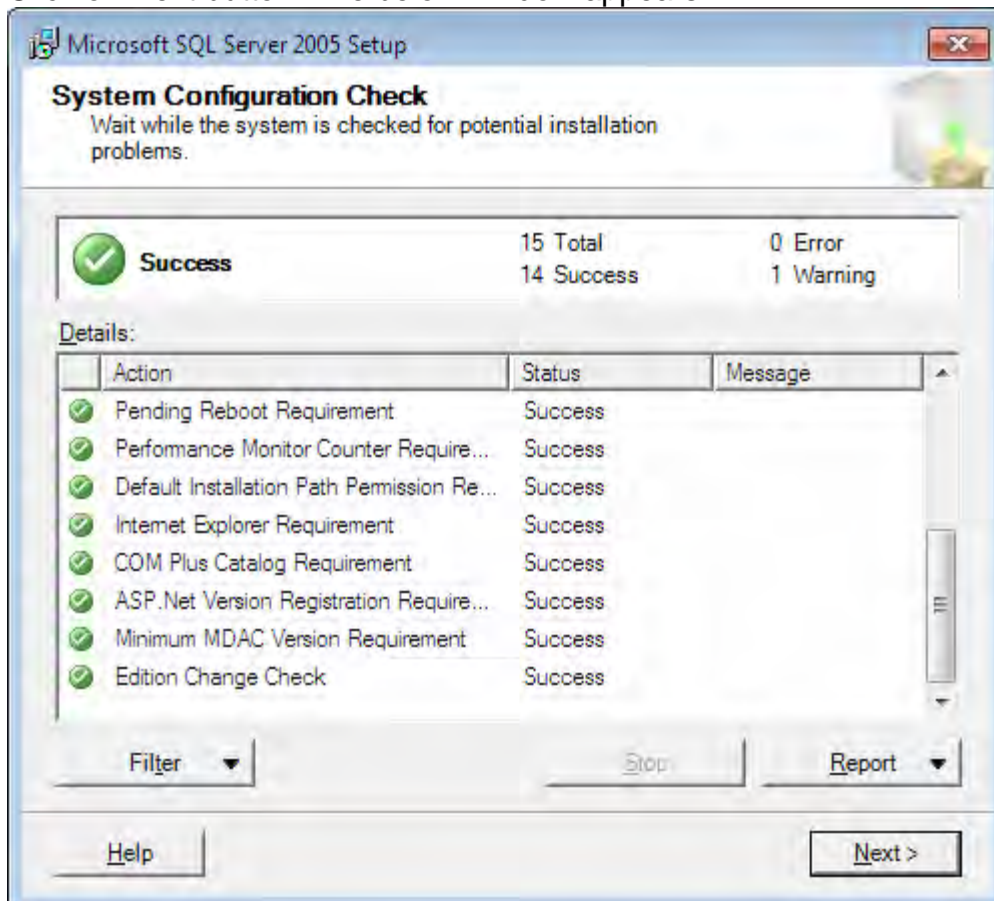




Again, click on Next button.



Click on Next button. The below window appears:



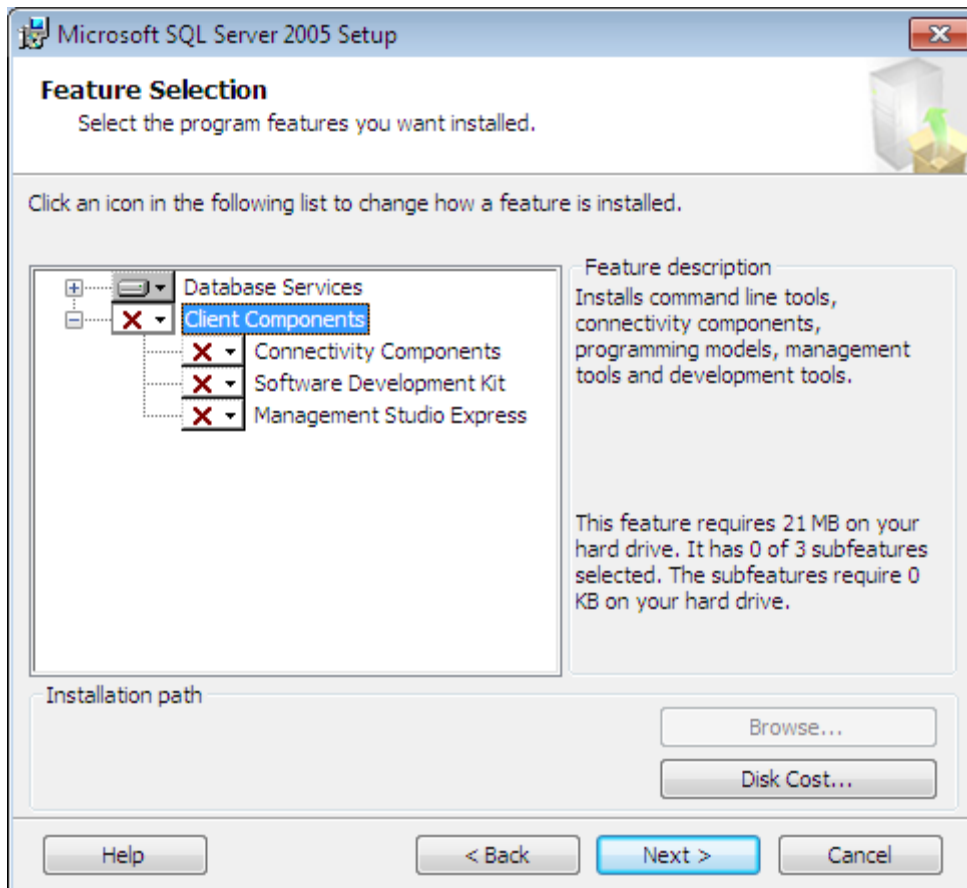
Click on Next button.



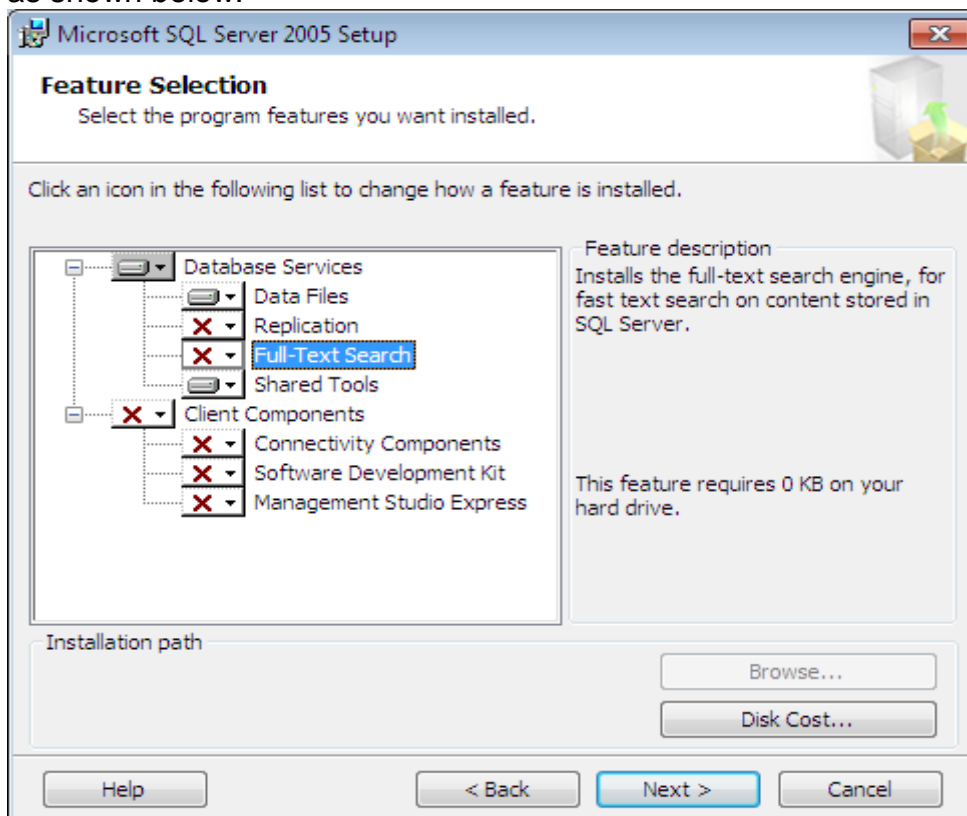
The screenshot shows the 'Registration Information' window from the Microsoft SQL Server 2005 Setup. The window has a title bar that reads 'Microsoft SQL Server 2005 Setup'. Below the title bar, the section is titled 'Registration Information' with a subtitle 'The following information will personalize your installation.' A note states: 'The Name field must be filled in prior to proceeding. The Company field is optional.' There are two text input fields: 'Name:' with the text 'nspl' entered, and 'Company:' which is empty. At the bottom left, there is a checkbox labeled 'Hide advanced configuration options' which is checked. At the bottom right, there are three buttons: 'Help', '< Back', and 'Next >', with the 'Next >' button highlighted. A 'Cancel' button is also present to the right of 'Next >'.

Enter the Name field and click on Next button. The Checkbox can be left in 'Checked' state.

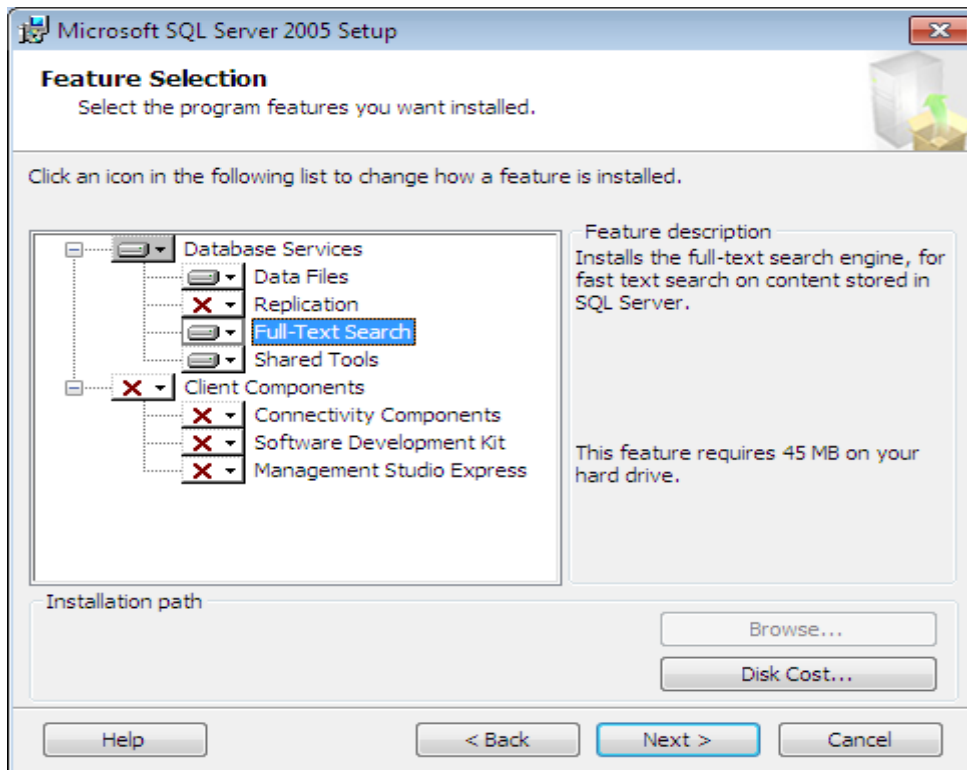
A feature selection screen appears as below:



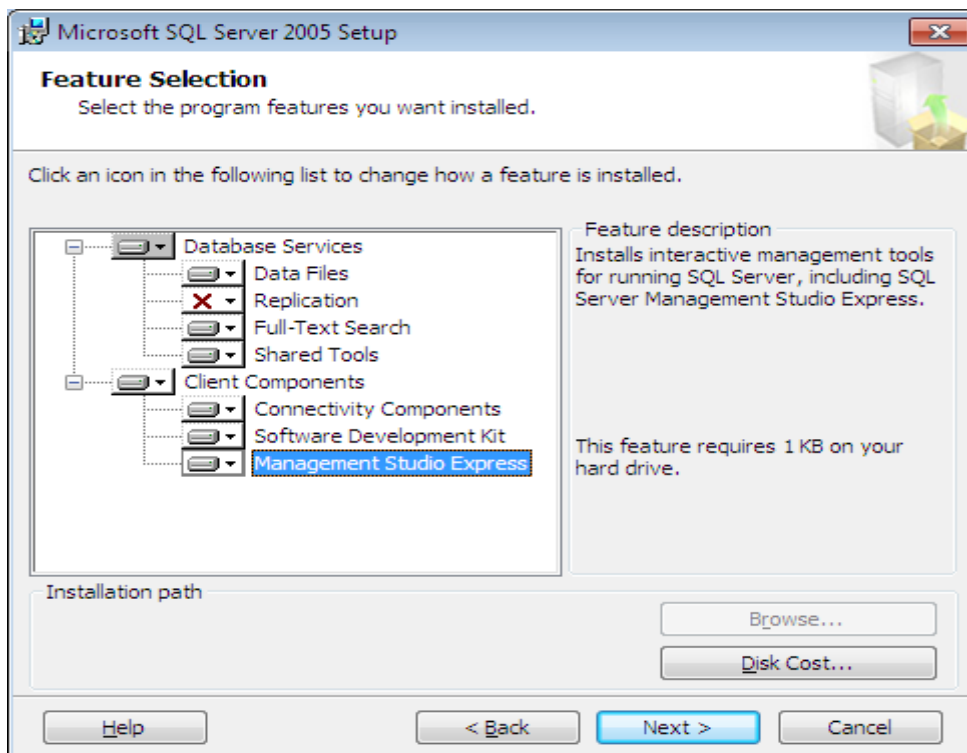
Expand the 'Database Services' category by click in '+'. The window will appear now as shown below:



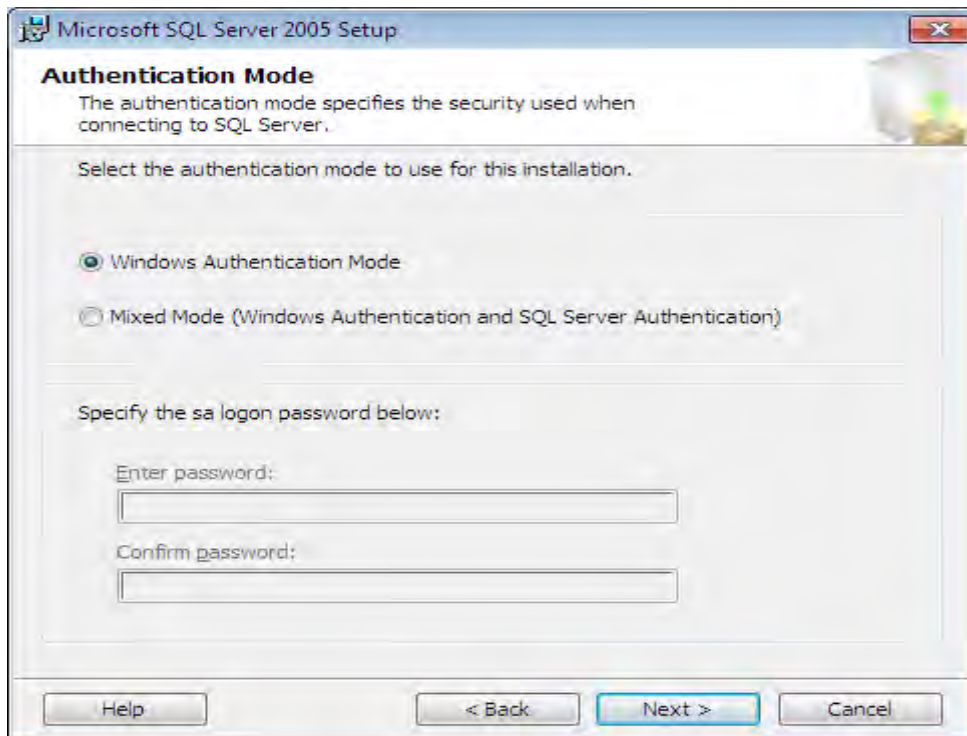
Select the 'Full-text Search', click on 'X' button to its left and select 'Entire feature will be installed on local hard drive'.



Similarly, do the same procedure for 'Connectivity Components', 'Software Development kit' and 'Management Studio Express'. The window will now be seen as below:



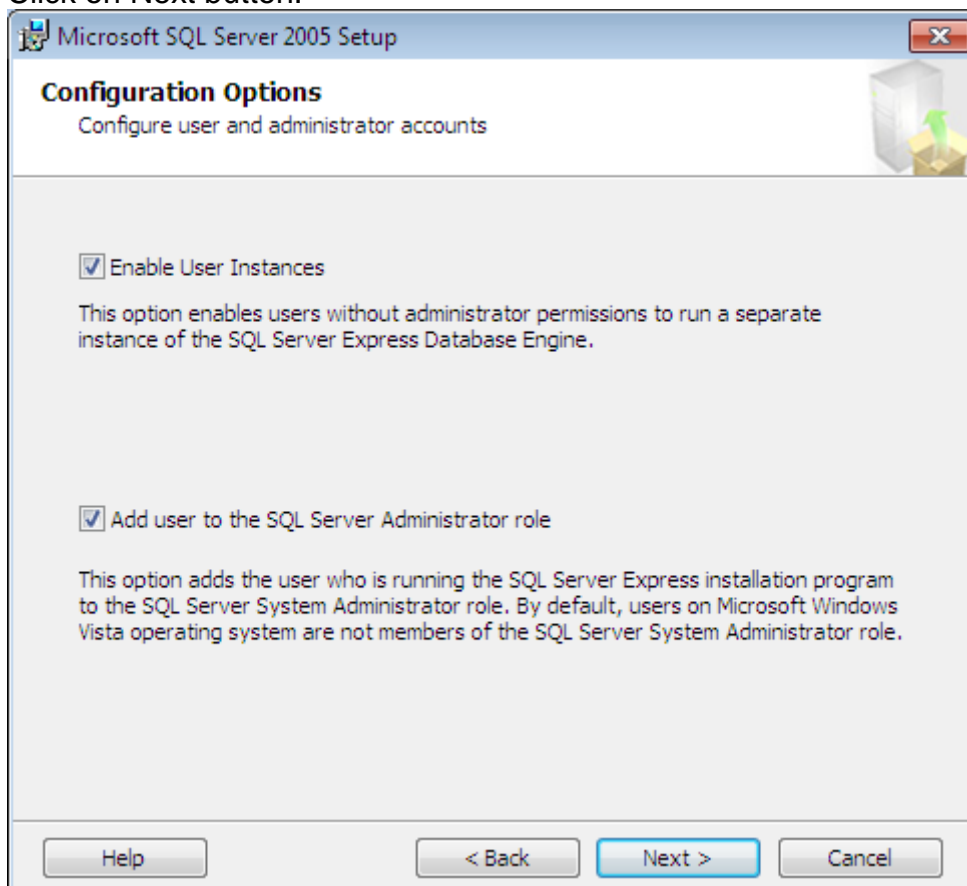
Click on Next button. The below window appears:



Select the Radio button 'Mixed Mode (Windows Authentication and SQL Server Authentication)'.

The password fields are enabled. Enter 'Nspl123' as the password in both text boxes. Note that the password is case sensitive and must be exactly matching 'Nspl123'.

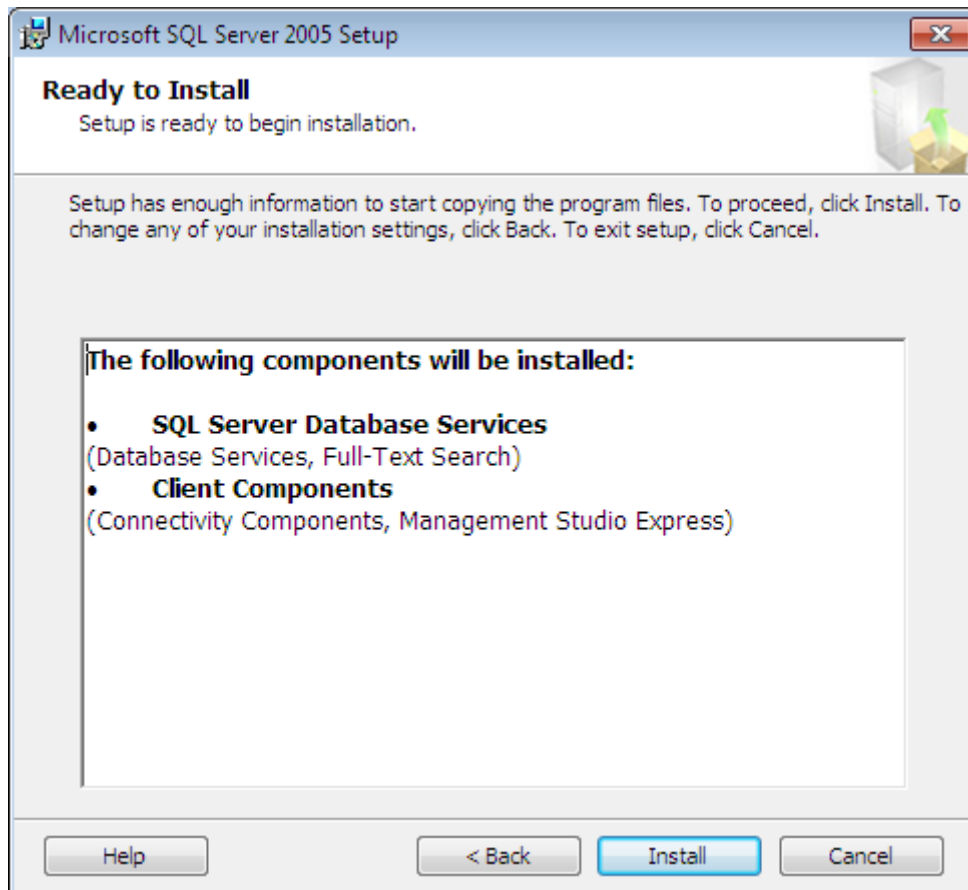
Click on Next button.



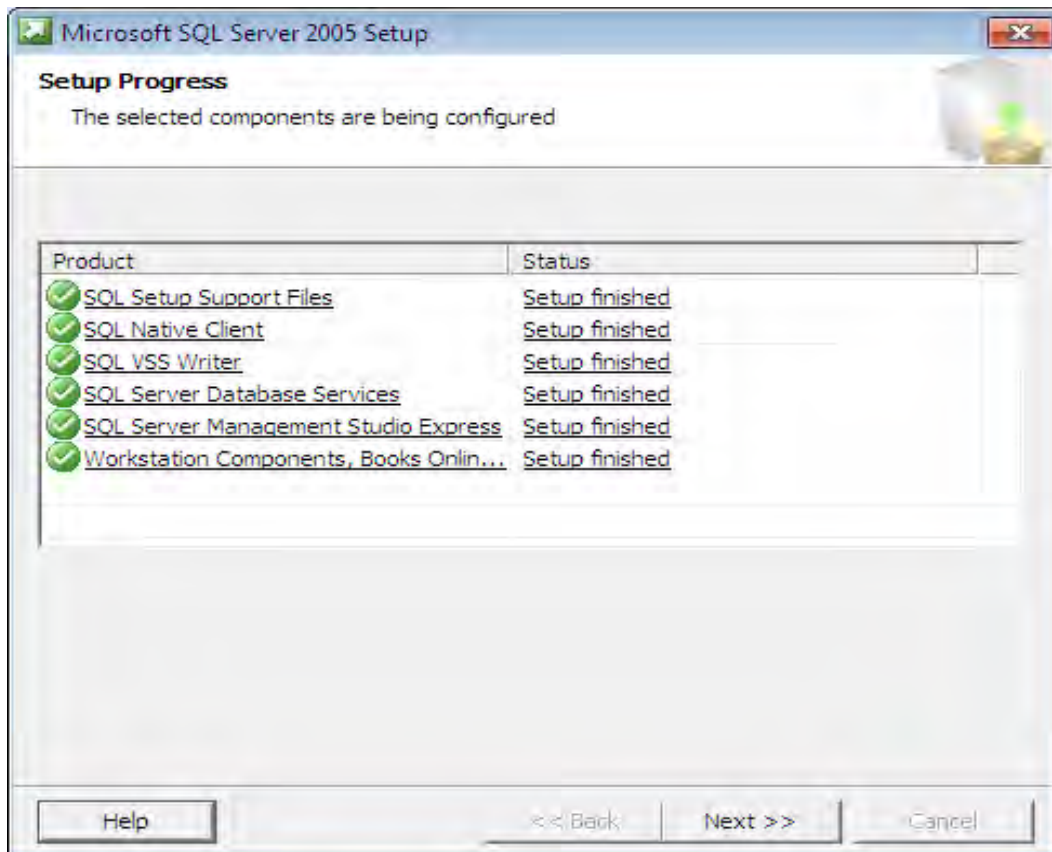
Click on 'Add User to the SQL Server Administrator role' Checkbox. Click on Next button.

In the window that appears, do nothing. Click on Next button. This completes the configuration part.

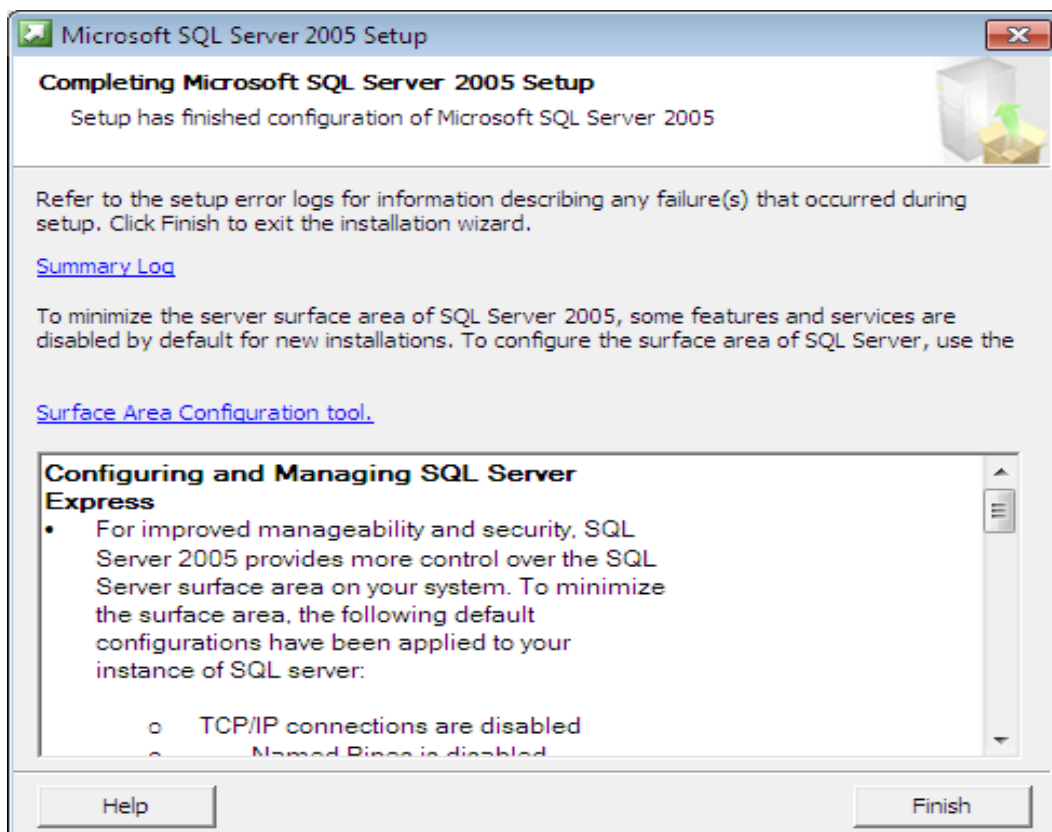
The below window appears:



Click on 'Install' button to start the installation. Installation process will take a few minutes The below window then appears:



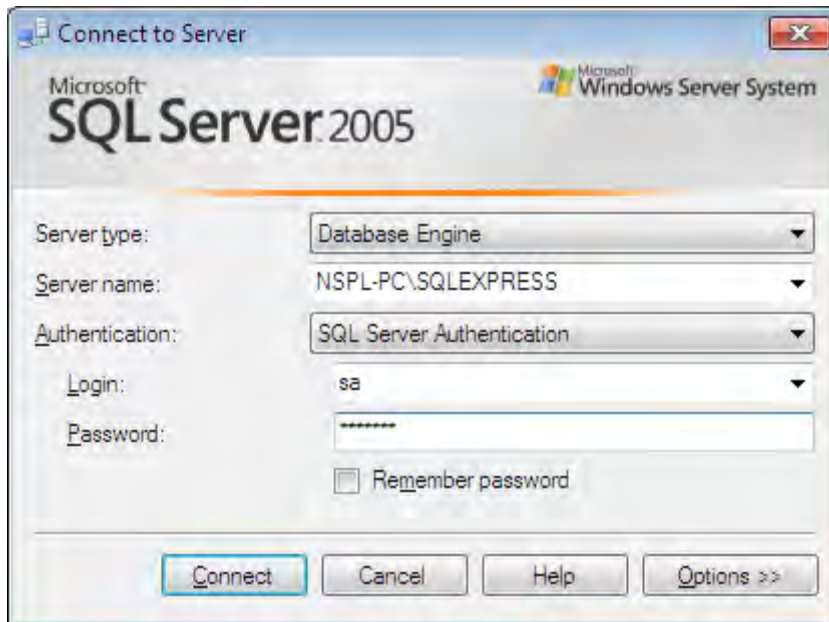
Click on Next button and it shows the final screen:



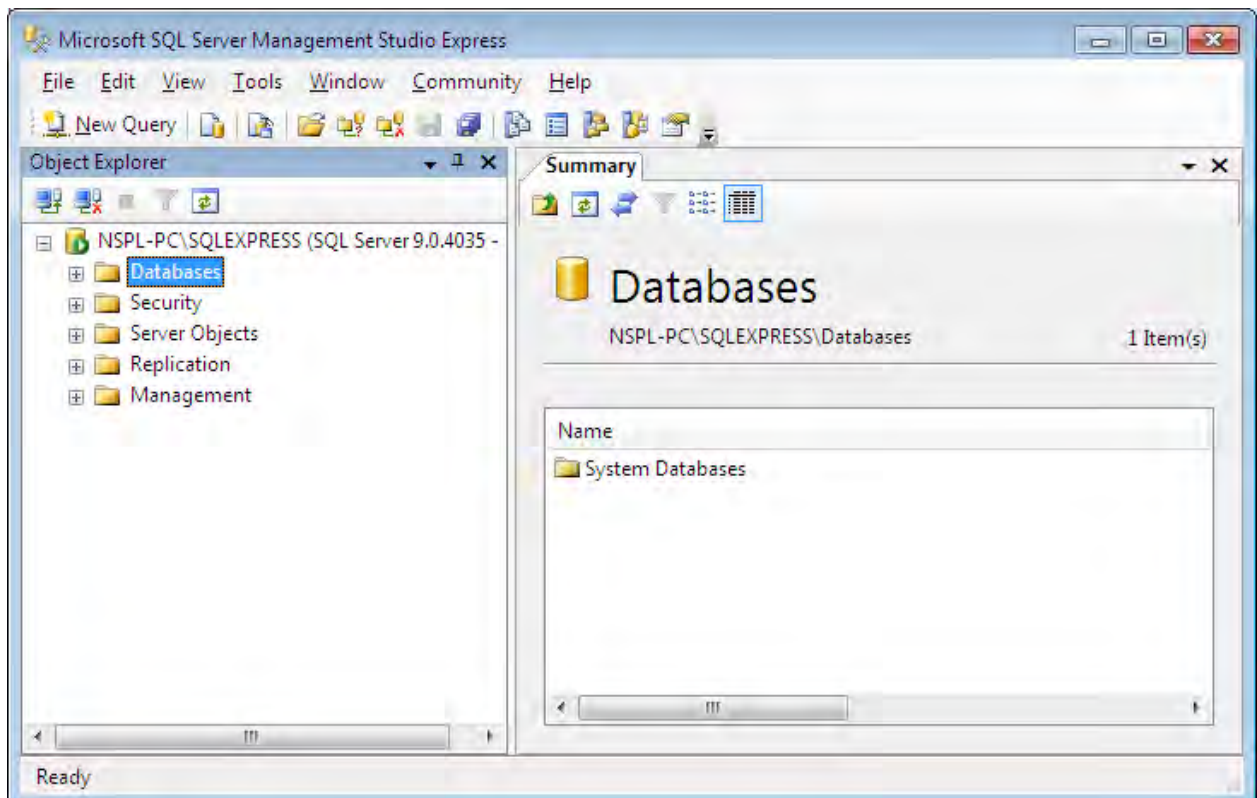
Click on 'Finish' button to complete the installation.

### ATTACHING 'DoseTicket' DATABASE:

Click on Start-> SQL Server Management Studio Express.  
The below window shows up:

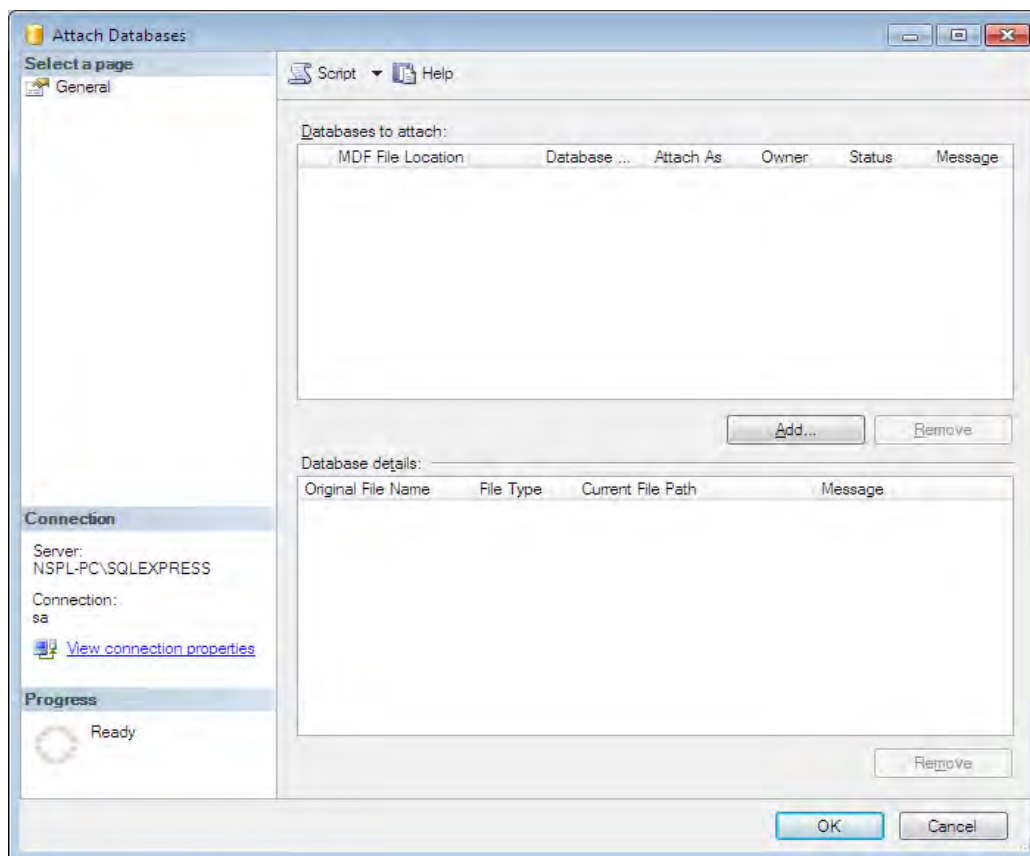


Type 'Nspl123' as password and click on 'Connect'.



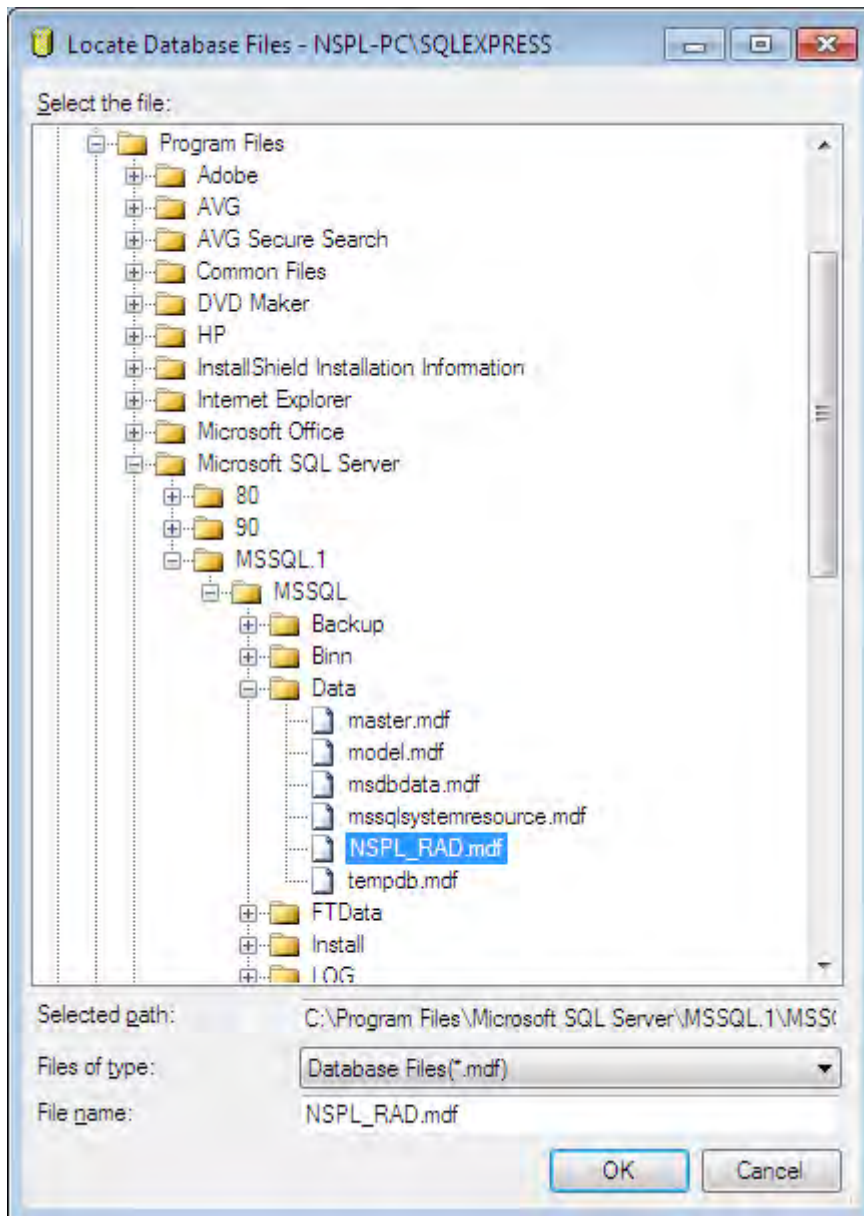


Right Click on 'Databases' and select Attach. The below window appears:



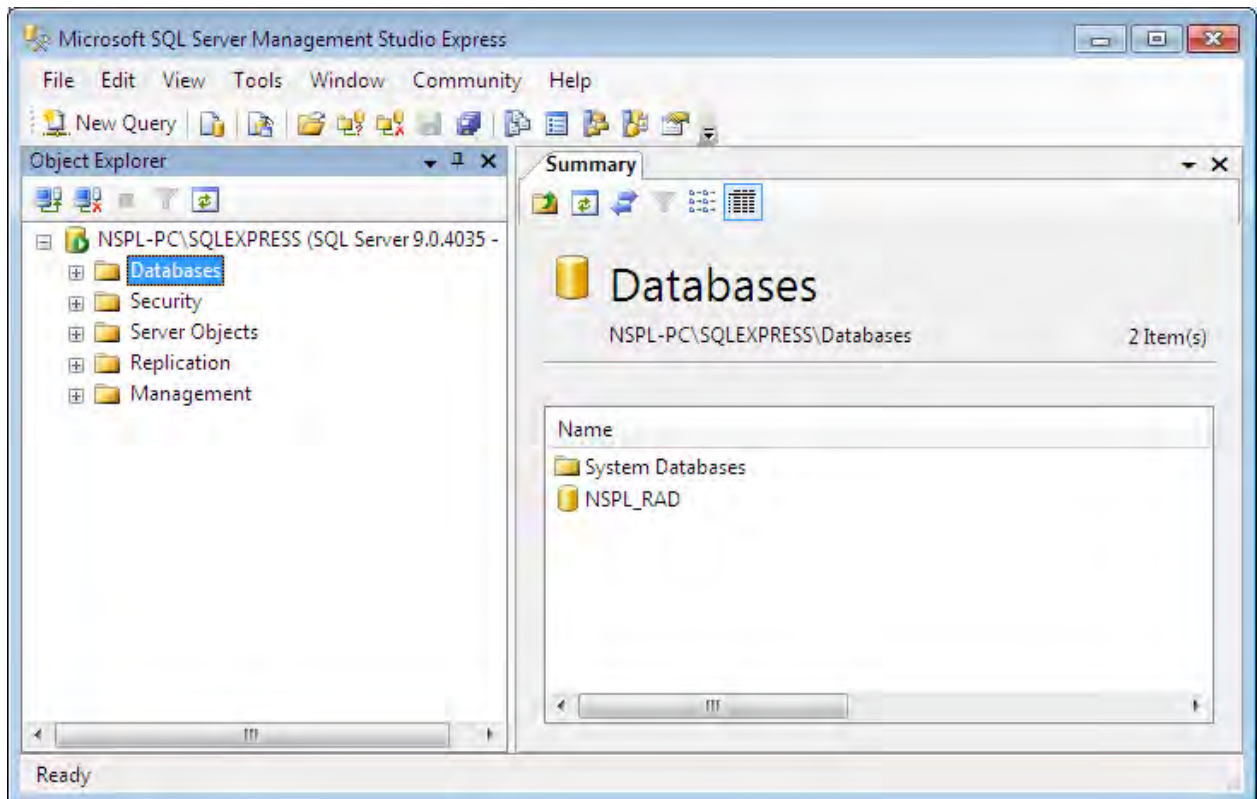
Click on Add button. The below window appears:





Select the DoseTicket.mdf database file and click ok.  
If this file is not found, then manually copy this file from the Installation CD to the above location.

Click 'Ok' again. The file can now be found in 'Databases' as shown below:



This completes the installation of SQL Server Express 2005 and attachment of Dose Ticket database to it.

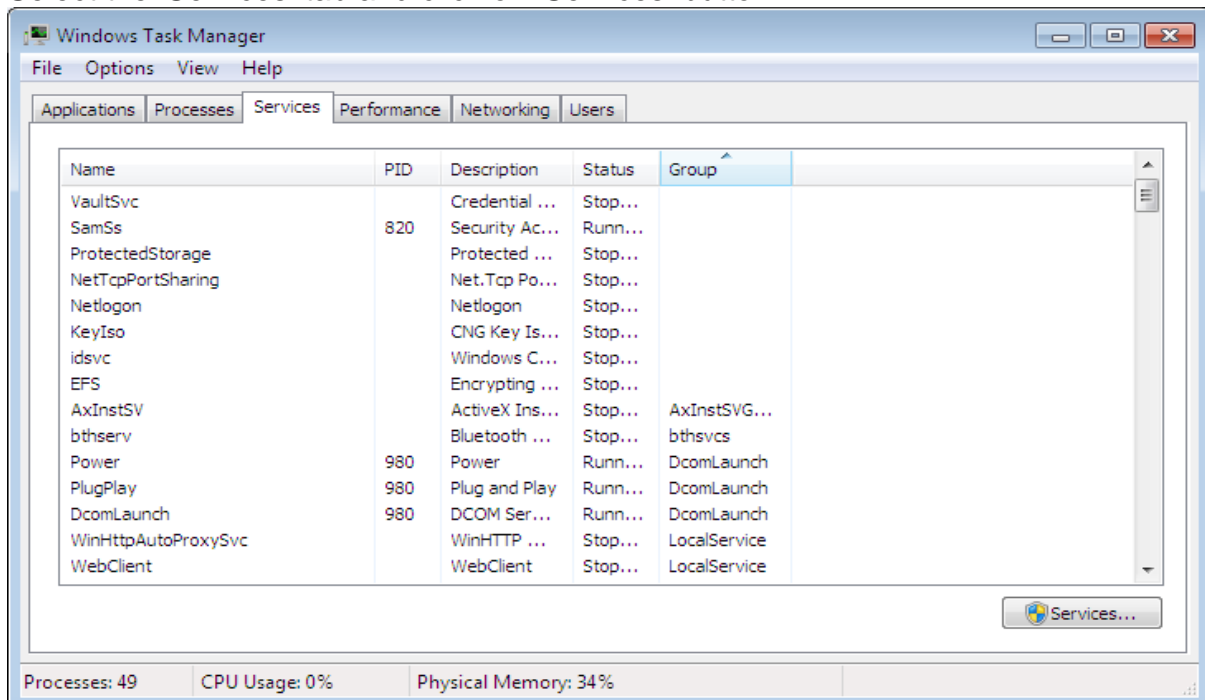
Dose Ticket Software can be now installed if not done already and executed.

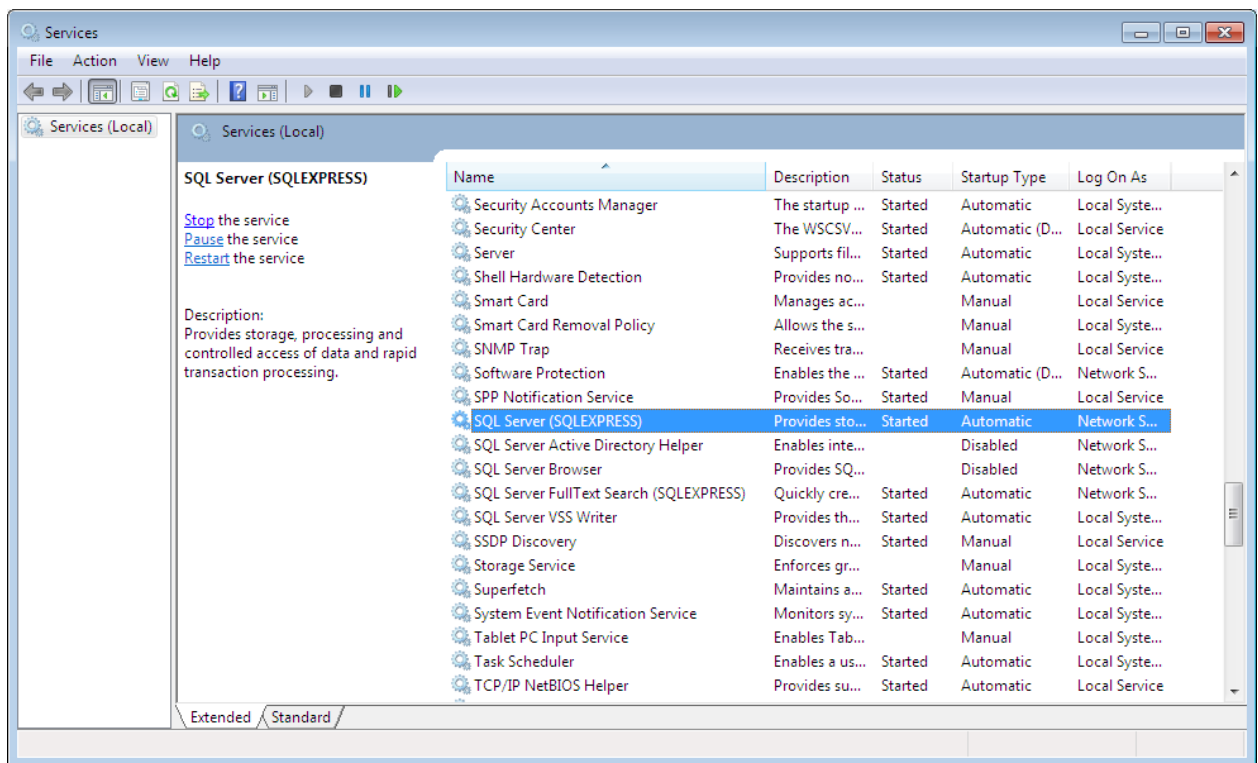
### **Procedure for Uninstalling MS SQL Server Express 2005 - Nucleonix**

Monday, June 17, 2013

Press 'Control + Alt + Del' to open 'Task Manager' application as shown below:

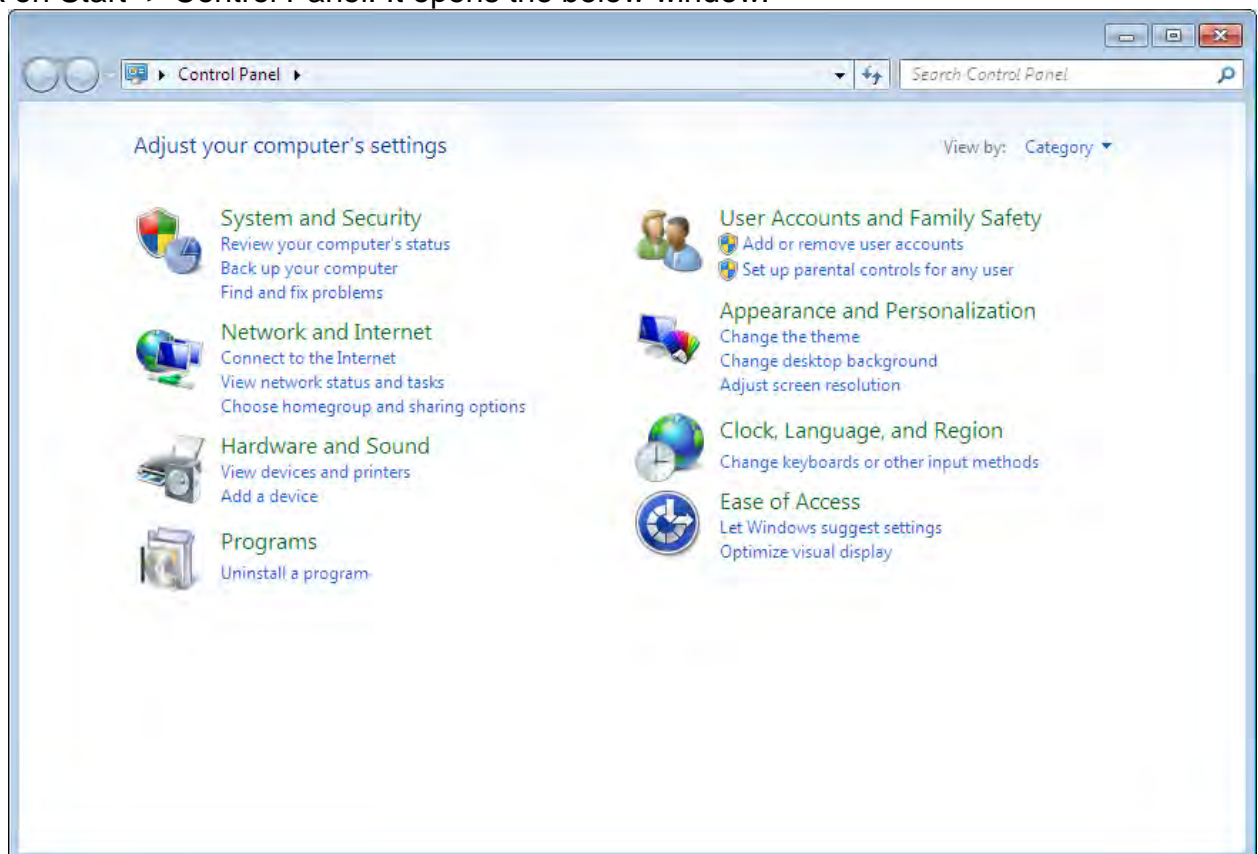
Select the 'Services' tab and click on 'Services' button.



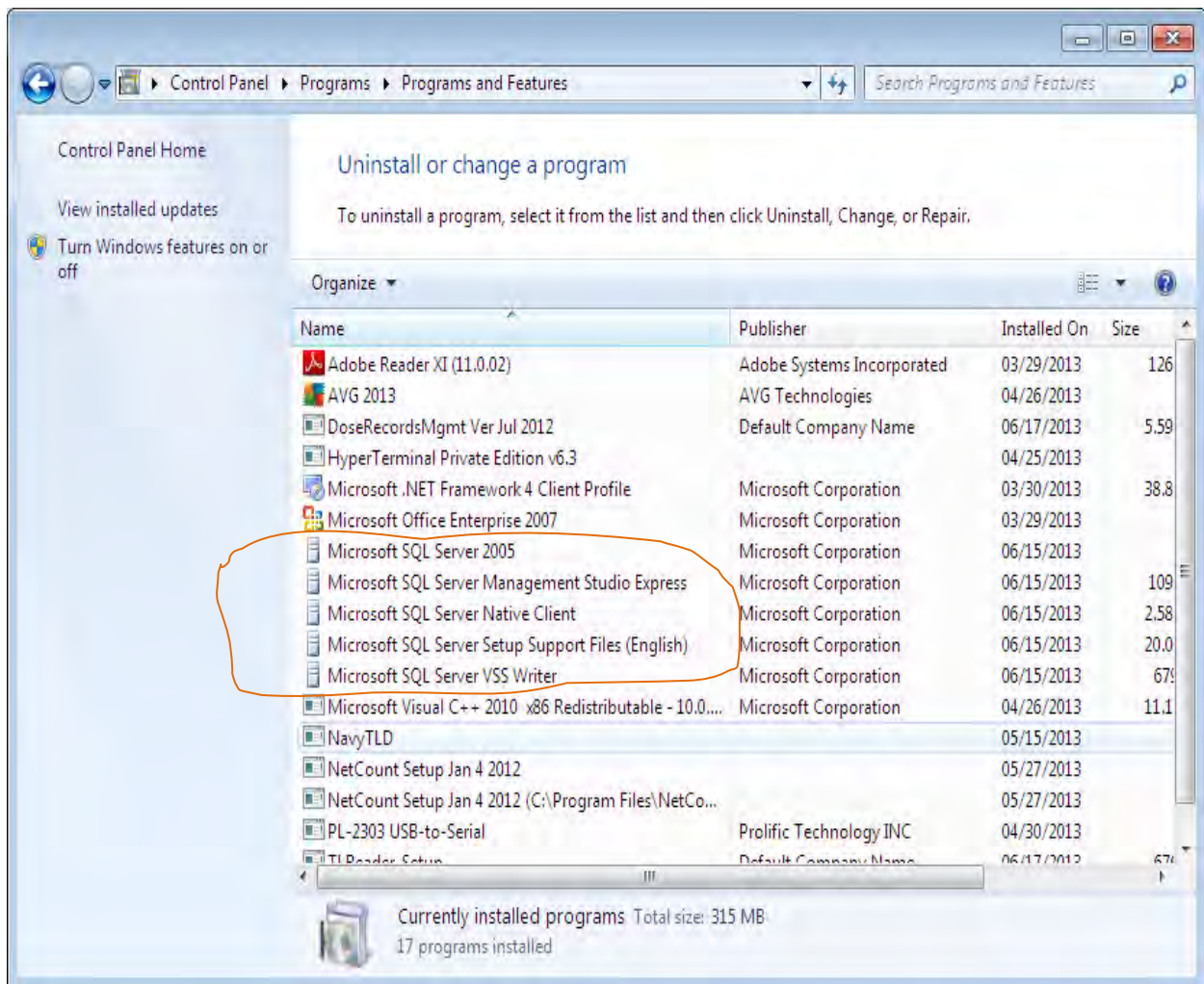


Scroll down and locate 'SQL Server (SQLEXPRESS)' service. Right click on it and click on Stop. Similarly, stop any other SQL Server related services. In the above Window, we can observe that 'SQL Server Fulltext search' and 'SQL Server VSS Writer' services are both Started and need to be Stopped.

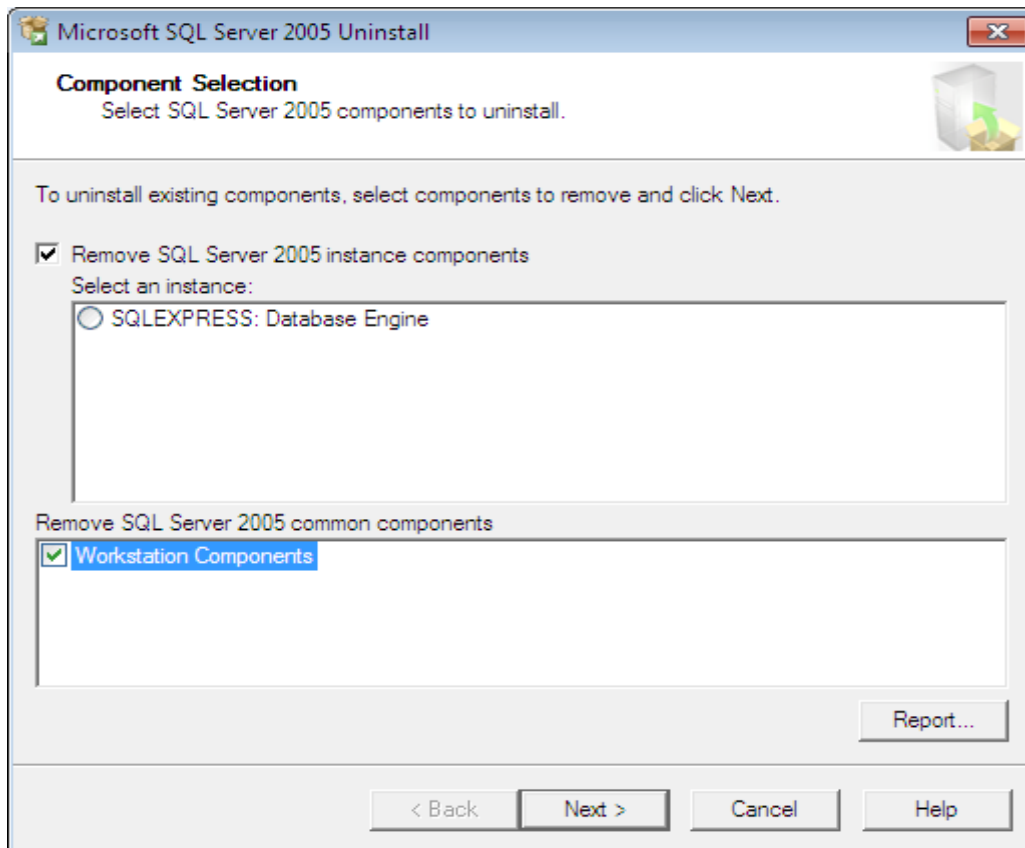
Click on Start -> Control Panel. It opens the below window:



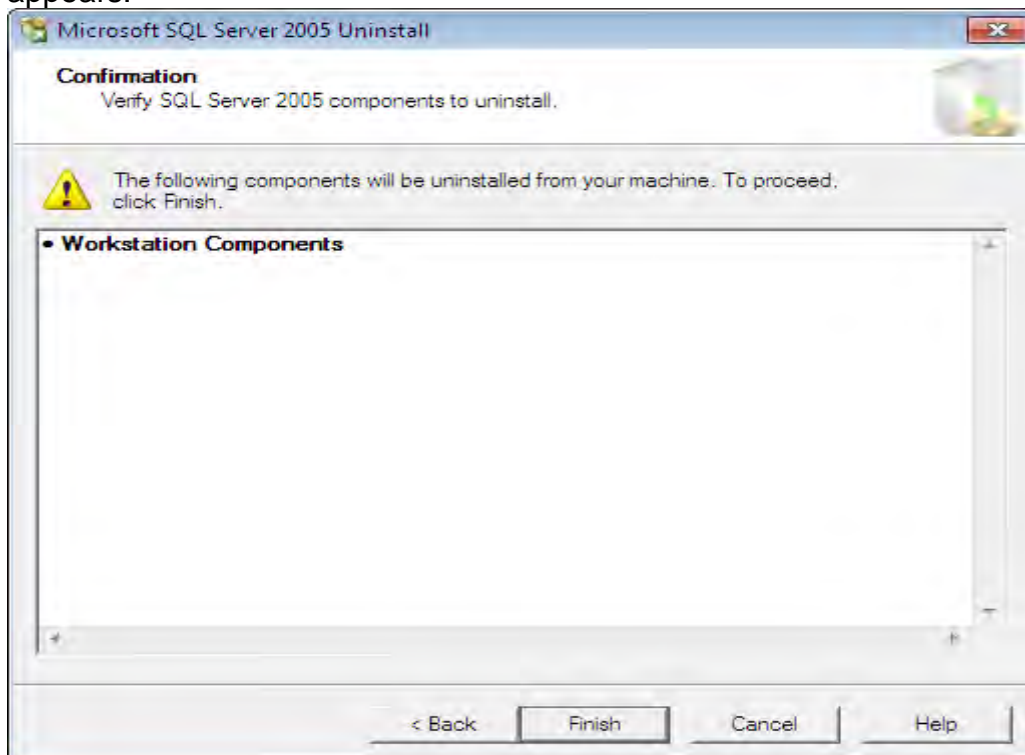
In the above Window, click on 'Uninstall a program'. It opens a window similar to the one below:



Notice SQL Server related installations. All of them have to be sequentially uninstalled. First click on 'Microsoft SQL Server 2005'. 'Uninstall' button appears. Click on it to start uninstalling. The below window appears:

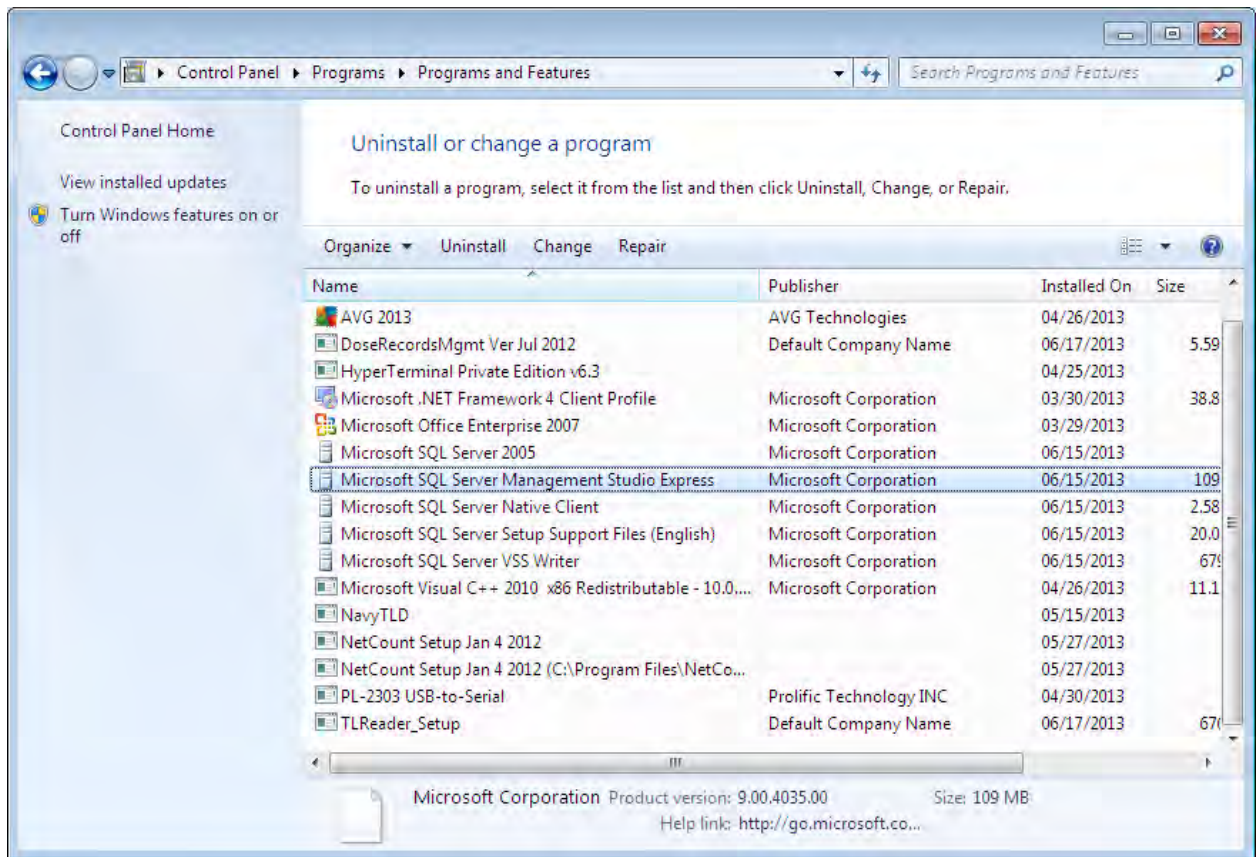


Ensure that both Checkboxes are selected. Click on Next button. The below window appears:

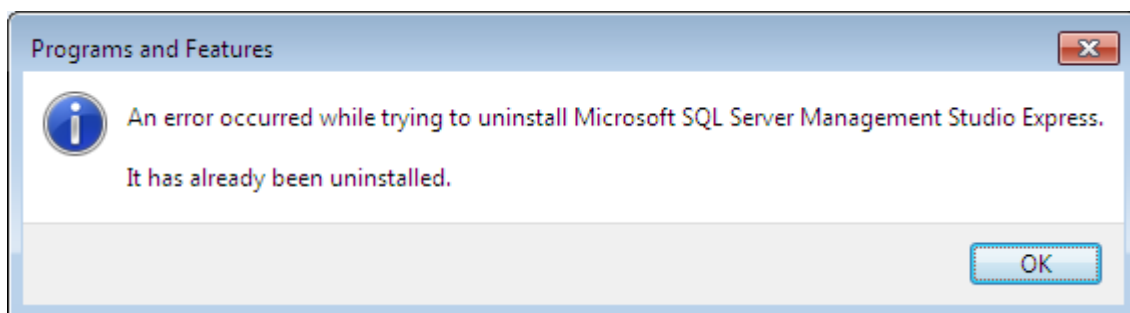


Click on Finish button. Various components are removed and the window is closed.





Now select the next item: 'Microsoft SQL Server Management Studio Express' and click on Uninstall.



You might see the above message. Click on 'Ok'. Similarly uninstall the remaining SQL Server related applications. This is the procedure for uninstalling SQL Server Express 2005 & its related comp

## Chapter IX



**AEA Technology  
QSA Inc.**

40 North Avenue  
Burlington, MA 01803  
Telephone (781) 272-2000  
Telephone (800) 815-1383  
Facsimile (781) 273-2216

# Source Certificate

Radionuclide : Cesium-137

Source Model : 77302

ISO/ANSI Classification : C66546

Source Serial : S-1028

IAEA Special Form Certification : GB 24 /S

Measured Equivalent Activity : 161.5 millicuries on 05-Aug-02

Source Physical Size :

Quality Control Tests

Diameter : 0.118 in 3.00 mm  
Length : 0.118 in 3.00 mm  
Maximum : 0.167 in 4.24 mm

Wipe Test A : < 0.001 µCi  
Wipe Test B : < 0.001 µCi  
Test Date : 05-Aug-02

Decay Data

Date	Activity (Millicuries)	Date	Activity (Millicuries)
05-Aug-02	161.5	26-Dec-09	136.1
03-Nov-02	160.6	26-Mar-10	135.4
01-Feb-03	159.7	24-Jun-10	134.6
02-May-03	158.8	22-Sep-10	133.8
31-Jul-03	157.9	21-Dec-10	133.1
29-Oct-03	157.0	21-Mar-11	132.3
27-Jan-04	156.1	19-Jun-11	131.6
26-Apr-04	155.2	17-Sep-11	130.8
25-Jul-04	154.3	16-Dec-11	130.1
23-Oct-04	153.4	15-Mar-12	129.3
21-Jan-05	152.6	13-Jun-12	128.6
21-Apr-05	151.7	11-Sep-12	127.9
20-Jul-05	150.8	10-Dec-12	127.1
18-Oct-05	150.0	10-Mar-13	126.4
16-Jan-06	149.1	08-Jun-13	125.7
16-Apr-06	148.3	06-Sep-13	125.0
15-Jul-06	147.4	05-Dec-13	124.3
13-Oct-06	146.6	05-Mar-14	123.6
11-Jan-07	145.8	03-Jun-14	122.9
11-Apr-07	144.9	01-Sep-14	122.2
10-Jul-07	144.1	30-Nov-14	121.5
08-Oct-07	143.3	28-Feb-15	120.8
06-Jan-08	142.5	29-May-15	120.1
05-Apr-08	141.7	27-Aug-15	119.4
04-Jul-08	140.9	25-Nov-15	118.7
02-Oct-08	140.1	23-Feb-16	118.1
31-Dec-08	139.3	23-May-16	117.4
31-Mar-09	138.5	21-Aug-16	116.7
29-Jun-09	137.7	19-Nov-16	116.1
27-Sep-09	136.9	17-Feb-17	115.4

AEA Technology plc registered office  
329 Harwell (Oxfordshire) OX11 0BA  
Registered in England and Wales  
number 1093862

## GAMMA RAY SOURCE CALIBRATION

**14**mersham Q.S.A.

40 North Avenue  
Burlington Massachusetts

Isotope Cesium <sup>137</sup>	Half Life 30.2years	Rhm/Ci 0.32	Test No. 5923
Date Measured 05-AUG-2002	Source Identification S-1028	MilliRoentgens/hr at 1 meter 51.7	MilliCuries 161.5

### Source exposure conditions :

In calibration device model 773, serial number 397

The gamma-ray emission of the sealed source herein described was measured with a Radcal Corporation model 20X5-180 Ion Chamber whose relative response to cobalt<sup>60</sup>, cesium<sup>137</sup>, and 50 kvp X-rays had been determined by a National Institute of Standards and Testing, approved calibration laboratory. Sensitivity of the Ion chamber is monitored by reference to a NIST-Traceable cobalt<sup>60</sup> source. Readings were corrected for atmospheric temperature and pressure and for ambient air scattering and absorption. The source was measured with its axis of symmetry perpendicular to the line joining source and chamber center. The reported output represents the intensity expected in the absence of air and surrounding objects. It is believed to be accurate within +/- 7%, made up of the stated +/-5% uncertainty of the NIST source calibration and the +/-2% estimated precision of comparison.

Signed

DATE



## **CHAPTER – X**

### **HOW TO AVAIL CALIBRATION SERVICES (FOR INDIAN CUSTOMERS)**

Nucleonix Systems offers radiation calibration services to its customers. Calibration services are provided for Nucleonix Systems manufactured products only, in general, as a company policy.

How to avail calibration services:

It is best advised that each of the Radiation monitors including Area monitors are calibrated once in a year. When you want to send your Radiation monitor / Area monitor / Contamination monitor for calibration to our works. You may send the equipment for calibration, by following the steps given below:

1. Our standard calibration charges per equipment (All types of Radiation monitors including portable survey meters, contamination monitors & Area Gamma Monitors) are Rs: 2500 + Packing + Freight charges. You can email a 'work order' accepting these charges.
2. Email your work order and despatch / send the equipment to our works if it is 5 years old or less including details of mode of transport sent with docket particulars.
3. Also mention in your work order & clearly indicate that you will agree to pay calibration charges & also equipment repair charges additionally if the unit is faulty & requires repairs before one can take it up for calibration.
4. You are requested to ensure good packing to avoid any transportation damages. Especially if there are external detector probes, they are to be packed with sufficient soft foam to ensure no damage in transportation.
5. Use only the specified following mode of transportation system for dispatching on door delivery basis. XPS/GATI cargo / Courier/RPP/Speed Post parcel etc. Send the equipment on freight paid basis. (Equipments sent by other methods such as Rail/Road etc will not be collected). Also you can cover for transit insurance both ways if you wish. Nucleonix system is not responsible for any transportation damages or loss during transportation both ways.
6. Immediately on receipt of the equipment, we will send an acknowledgement & also a proforma bill by email/ post.
7. Based on the proforma bill, once we receive the payment, equipment will be dispatched back by similar mode of transportation as mentioned above.

### **12.5 HOW TO AVAIL CALIBRATION SERVICES (FOR FOREIGN CUSTOMERS)**

Foreign customers can calibrate Nucleonix make Radiation monitors/equipments in their country at any of their accredited Radiation calibration labs. Nucleonix systems will be happy to provide any help and guidance if needed, for calibration. Alternatively if you send the equipment here to India we can also provide calibration services.

Calibration Standards Lab & Facility:  
We have two calibration labs.

- i. Low Level Calibration Lab.
- ii. High Dose Rate Calibration lab.

**Low Level Calibration Lab:** This has a Cs-137, 165 mci standard. "Gamma Survey Instruments Calibrator" from Amersham.

This calibration service has NIST Traceability standard. Calibration of all portable radiation monitors, survey meters, contamination monitors, Area monitors etc., is carried out in this lab upto 1 R/hr max dose rates.



Gamma Survey instruments calibrator has Cs-137 source 161.5 mCi as on 05 Aug 2002. It is basically a gamma survey instruments calibrator procured from AEA Technologies UK/USA. Has NIST traceability accuracy within +/- 7%



CRC-2 camera has Co-60 standard obtained from Bhabha Atomic Research Centre, Mumbai. It is a certified source.

## **12.5 ANNUAL MAINTENANCE CONTRACT (AMC)**

### **Annual maintenance contract (AMC) services:**

For all sophisticated instruments & systems and also for installed monitors & networked systems in a nuclear facility or a Radiological lab or in a Medical cyclotron facility where no. of instruments are networked, it is advised that customer enters into an economical Annual maintenance contract with Nucleonix system.

Detailed AMC proposal can be obtained from our customer support division (CSD), by giving required inputs.

### **Inputs required by our CSD to send you AMC proposal:**

I. Name, year & date of purchase, Sl. Nos. of equipments, Model No's, No. of equipments for which AMC is required. Additionally no. of calls per annum required for preventive & breakdown maintenance may also be indicated.

### **Advantage of entering into AMC:**

- I. Equipment services offered will be prompt & timely
- ii. Nucleonix systems maintain required spares, spare tested PCBs, detectors & other critical components which may become obsolete.
- lii. Obsolescence in electronics is quite rapid. If you enter into AMC guaranteed service for the period of AMC will be the responsibility of Nucleonix Systems.
- iv. Nucleonix Systems will maintain Engineers at your disposal to attend to AMC calls on time
- v. Without AMC prompt service calls are not guaranteed.
- vi. If some critical components become obsolete, then Nucleonix systems may request you to upgrade the product with new model or new electronics which may be expensive if you are not under AMC.

### **Training on maintenance / servicing:**

To a limited extent, we offer training on maintenance / repairs at our works to customers on chargeable basis. Details can be obtained from our customer support division, by customers who may require such services.

## CHAPTER –XI

### 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: +91-7207034546, 68888777.

Mobile: 7331104480, 7331104481, and 7331104482

Email : info@nucleonix.com.

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

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#### 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

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#### Whom to Contact:

Business Executives:	Contact Numbers	Contact by E-mail ID
1. <b>R.Maniram</b> (Sr. Business Executive)	Mob:7331104481, Ph +91-7207034546	info@nucleonix.com
2. <b>Ch.Gayatri</b> (Business Executive)	Mob:7331104481, Ph +91-7207034546	info@nucleonix.com
3. <b>K.Swapna</b> (Business Executive)	Mob:7331104481, Ph +91-7207034546	info@nucleonix.com

**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.B.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

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**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)**

**Email:** info@nucleonix.com

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**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**  
**Email: info@nucleonix.com**

**f) General Manager**

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

**Shanthi Sri . P**

**Mob:**7331104480

**Email:** recruit@nucleonix.com

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**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.

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**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**



**NUCLEONIX SYSTEMS PVT. LTD.**

**Plot No.162 A & B, Phase-II, IDA, Cherlapally, Hyderabad-500051**

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**Email : [info@nucleonix.com](mailto:info@nucleonix.com) website : [www.nucleonix.com](http://www.nucleonix.com)**