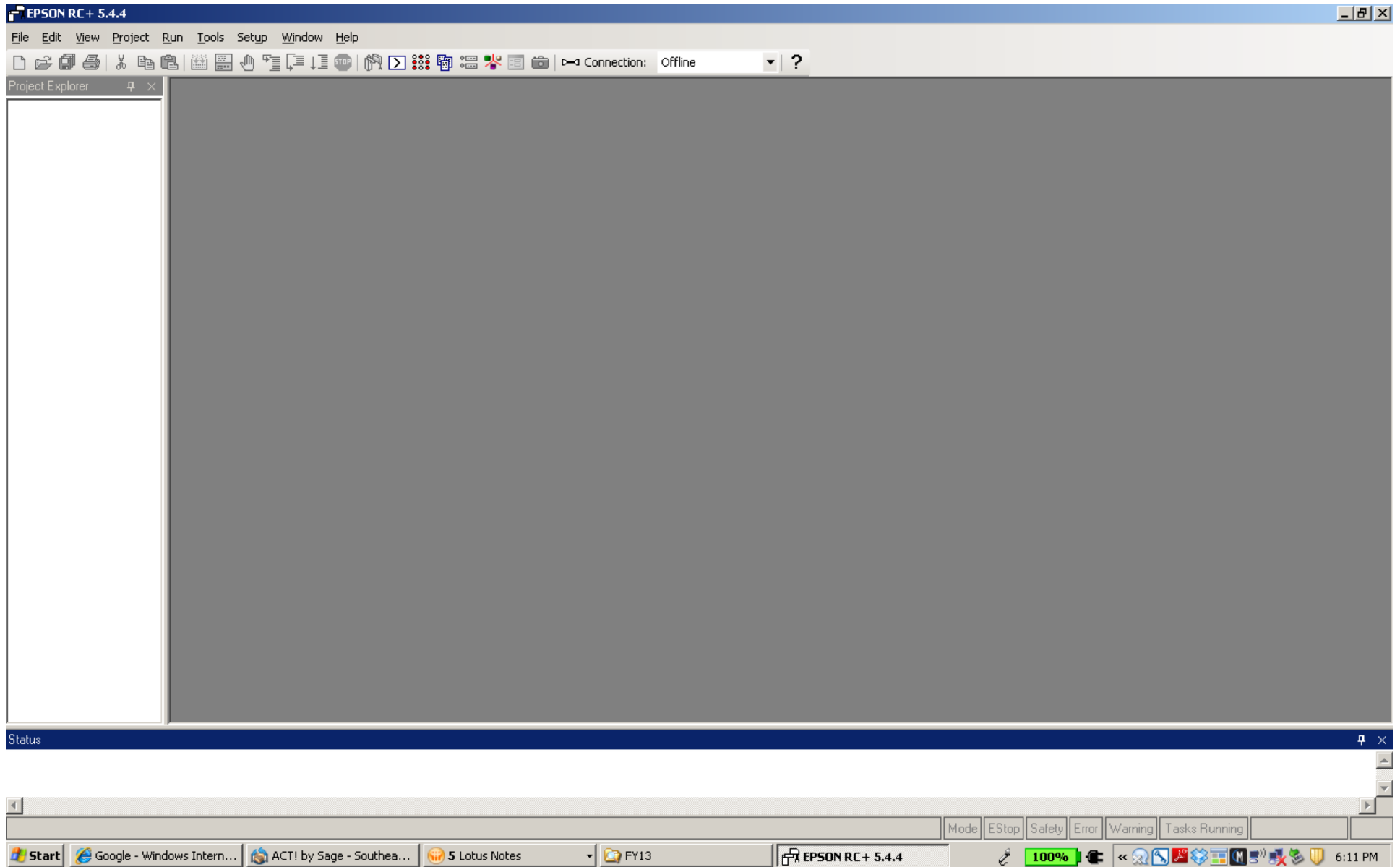


Step by Step Instruction to create a
New Project and Use our
Simulator.

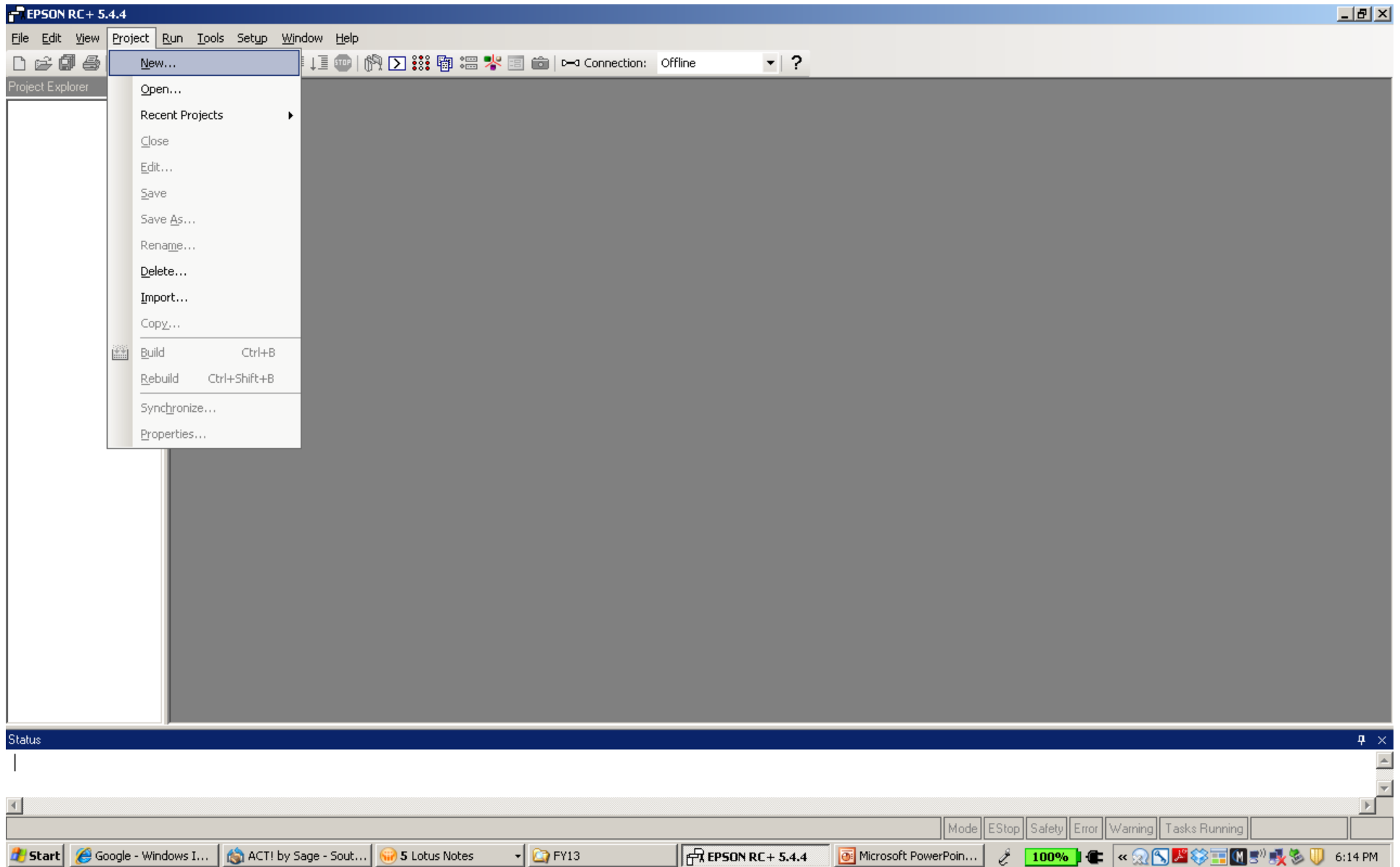
On the next page is an example to
be used for this training exercise.
See next page.

```
Long cycleCount
  Call InitRobot
Do
  Jump Start
    Wait Sw(PartInPos) = On
  Go Desp_1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
  Jump Desp_2 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
  Jump Desp_3 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
  Jump Desp_4 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
  Jump Desp_5 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
  Jump Desp_6 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
  cycleCount = cycleCount + 1
  Print "Cycle count: ", cycleCount
Loop
```

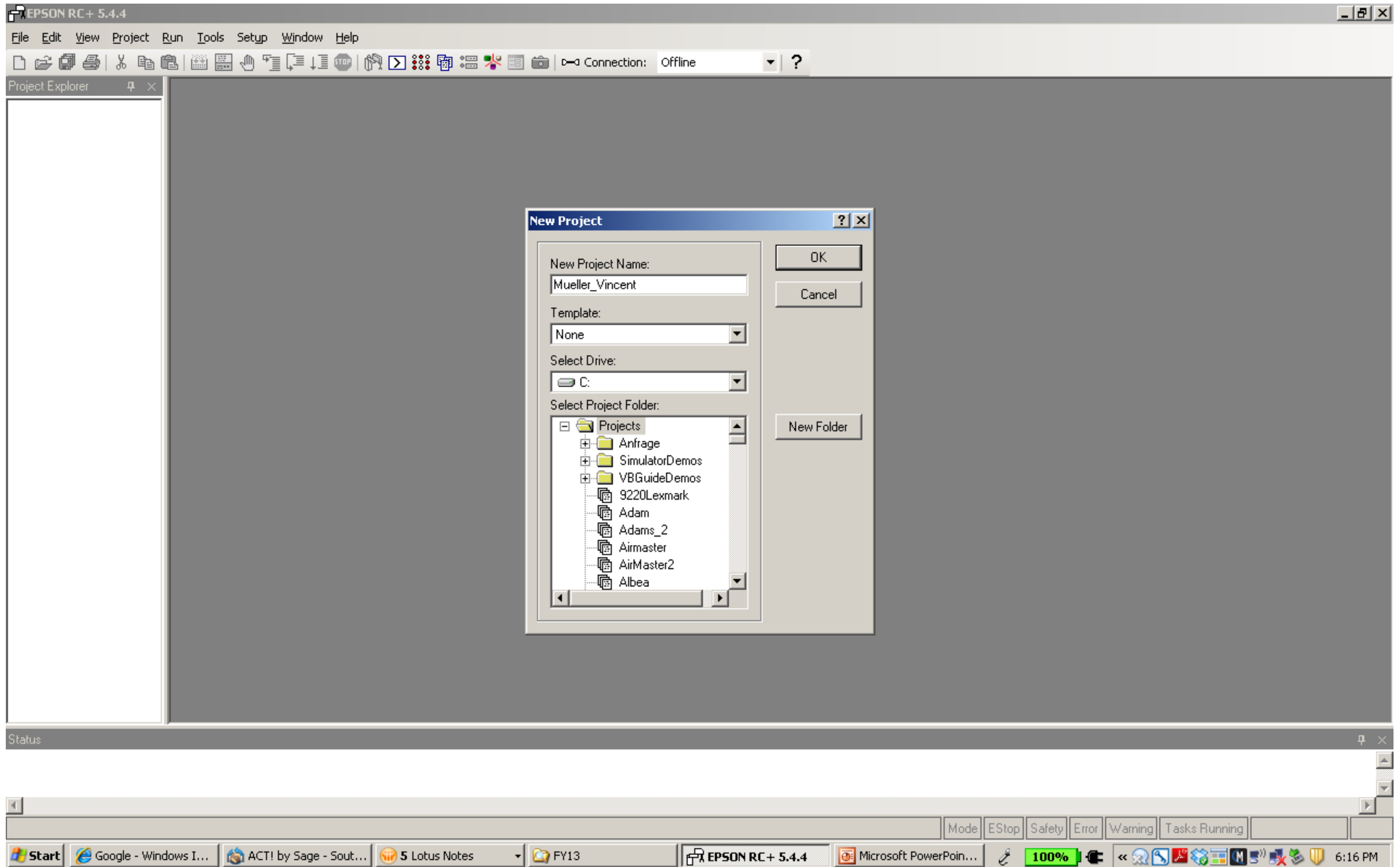
Open EPSON RC+ 5.4.4



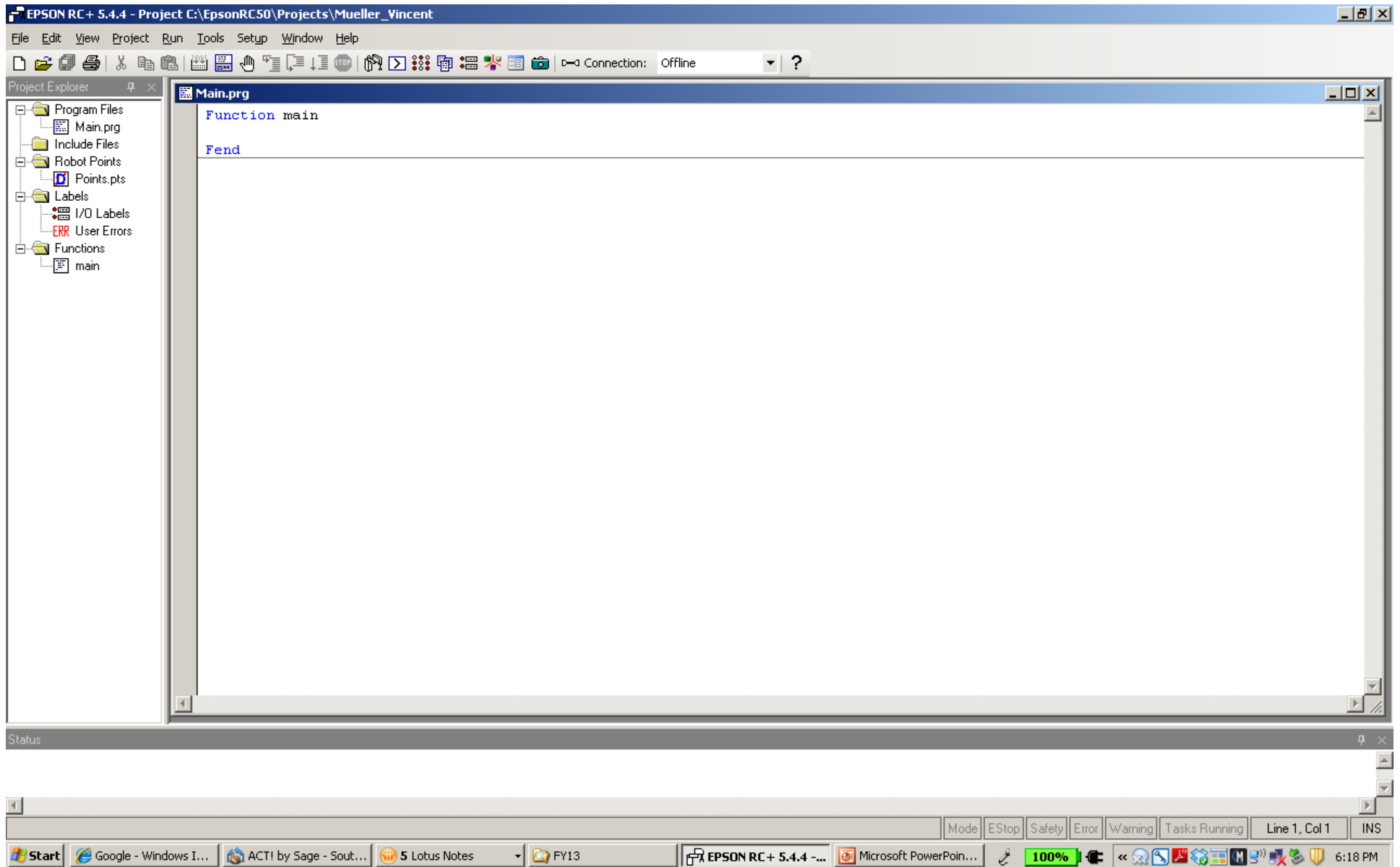
Start a New Project



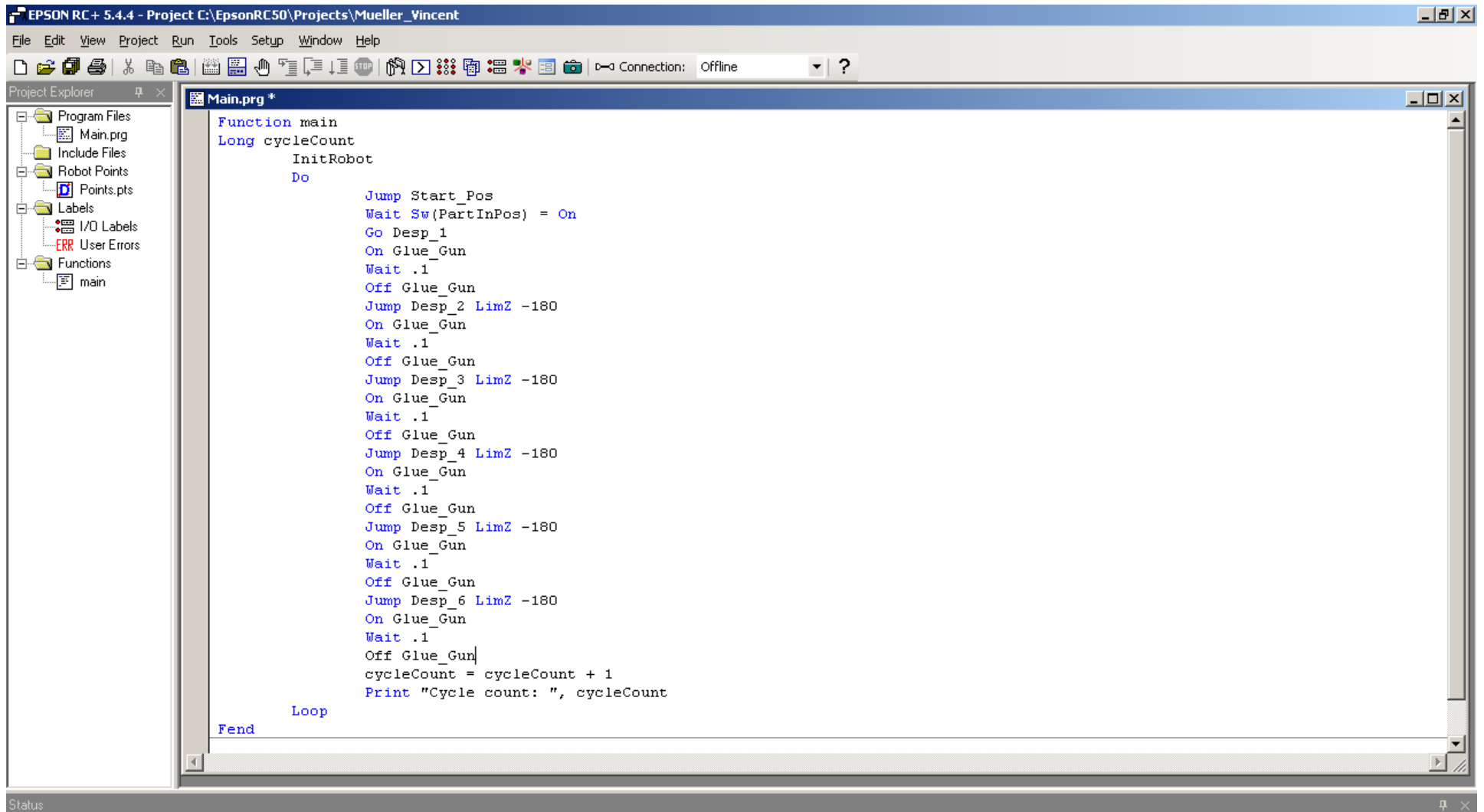
Give the New project a Name. Click OK!
Note; Do not use a template!



This is what will come up. Then copy the text from the second page and paste it between the “Function main” and “Fend”



This is what it should look like!



The screenshot displays the EPSON RC+ 5.4.4 software interface. The main window shows a ladder logic program for 'Main.prg'. The program starts with a 'Function main' block, followed by a 'Long cycleCount' declaration and an 'InitRobot' instruction. A 'Do' loop contains a sequence of operations: 'Jump Start_Pos', 'Wait Sw(PartInPos) = On', 'Go Desp_1', 'On Glue_Gun', 'Wait .1', 'Off Glue_Gun', 'Jump Desp_2 LimZ -180', 'On Glue_Gun', 'Wait .1', 'Off Glue_Gun', 'Jump Desp_3 LimZ -180', 'On Glue_Gun', 'Wait .1', 'Off Glue_Gun', 'Jump Desp_4 LimZ -180', 'On Glue_Gun', 'Wait .1', 'Off Glue_Gun', 'Jump Desp_5 LimZ -180', 'On Glue_Gun', 'Wait .1', 'Off Glue_Gun', 'Jump Desp_6 LimZ -180', 'On Glue_Gun', 'Wait .1', 'Off Glue_Gun', 'cycleCount = cycleCount + 1', and 'Print "Cycle count: ", cycleCount'. The loop ends with 'Loop' and 'Fend'.

```
Function main
Long cycleCount
  InitRobot
  Do
    Jump Start_Pos
    Wait Sw(PartInPos) = On
    Go Desp_1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_2 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_3 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_4 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_5 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_6 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    cycleCount = cycleCount + 1
    Print "Cycle count: ", cycleCount
  Loop
Fend
```

After you paste in the text, then you'll need create a Virtual Controller!
Fist click on the connect icon. Second click on ADD! You will get another popup menu!

The screenshot shows the EPSON RC+ 5.4.4 software interface. The main window displays a code editor for 'Main.prg' with the following code:

```
Function main
Long cycleCount

InitRobot

Do
    Jump Start_Pos
    Wait Sw(PartInPos) = On
    Go Desp_1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_2 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_3 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_4 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_5 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_6 Limit = 100
    On Glue_Gun
    Wait .1
    Off Glue_Gun

    cycleCount = cycleCount + 1
    Print "Cycle count: ", cycleCount
```

The 'PC to Controller Communications' dialog box is open, showing a table of connections:

Number	Name	Type	IP Address
11	ADAMS	Virtual	N/A
12	Mueller	Virtual	N/A
13	ATC	Virtual	N/A
14	TE	Virtual	N/A

The dialog box also includes buttons for 'Connect', 'Disconnect', 'Add', 'Delete', 'Apply', and 'Restore'. The 'Add' button is highlighted by an arrow labeled 'Second'. The 'Connection: Offline' dropdown menu in the top toolbar is highlighted by an arrow labeled 'first'.

The Windows taskbar at the bottom of the screen shows the Start button, several open applications including Google Chrome, Mail, Microsoft Excel, and EPSON RC+ 5.4.4, and system tray icons for Mode, EStop, Safety, Error, Warning, Tasks Running, Line 37, Col 1, and INS. The system clock shows 10:00 AM on 10/00/2010.

Click on Connection to New Virtual Controller. Then click OK.

The screenshot displays the EPSON RC+ 5.4.4 software interface. The main window shows a ladder logic program for 'Main.prg'. The code includes a 'Function main' block with a 'Long cycleCount' variable. The program starts with 'InitRobot' and enters a 'Do' loop. Inside the loop, it performs several actions: 'Jump Start_Pos', 'Wait Sw(PartInPos) = On', 'Go Desp_1', 'On Glue_Gun', 'Wait .1', 'Off Glue_Gun', 'Jump Desp_2', 'On Glue_Gun', 'Wait .1', 'Off Glue_Gun', 'Jump Desp_3', 'On Glue_Gun', 'Wait .1', 'Off Glue_Gun', 'Jump Desp_4', 'On Glue_Gun', 'Wait .1', 'Off Glue_Gun', 'Jump Desp_5', 'On Glue_Gun', 'Wait .1', 'Off Glue_Gun', 'Jump Desp_6', 'On Glue_Gun', 'Wait .1', 'Off Glue_Gun'. After the loop, it increments 'cycleCount' and prints the value.

The 'New Controller Connection' dialog box is open, showing a table of 'Current Connections' with columns for 'Number' and 'Name'. The table contains four entries with numbers 11, 12, 13, and 14. Below the table, there are two radio buttons: 'Connection to real controller via Ethernet' and 'Connection to new virtual controller'. The second radio button is selected. Below the radio buttons is a dropdown menu labeled 'Copy from existing virtual controller'. At the bottom of the dialog are 'OK' and 'Cancel' buttons. An arrow points to the selected radio button.

The screenshot shows the Windows taskbar at the bottom of the screen. The taskbar includes the Start button, several open applications (Google - Win..., Mail - Sent - I..., > RE: Lost F..., Microsoft Excel, QuoteWerks ..., EPSON RC+ ..., New Control...), and the Microsoft PowerToys icon. The system tray on the right shows a 100% battery indicator and the time 10:07 AM.

This will take you back to the previous Menu Screen, and you'll have a new controller under the Name Tab call Virtual1. Change the name to anything you like! Then Click Apply!

The screenshot shows the EPSON RC+ 5.4.4 software interface. The main window displays a code editor for 'Main.prg' with the following code:

```
Function main
Long cycleCount

InitRobot

Do
    Jump Start_Pos
    Wait Sw(PartInPos) = On
    Go Desp_1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_2 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_3 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_4 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_5 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_6 Limit = 100
    On Glue_Gun
    Wait .1
    Off Glue_Gun

    cycleCount = cycleCount + 1
    Print "Cycle count: ", cycleCount
```

The 'PC to Controller Communications' dialog box is open, showing a table of controller information:

Number	Name	Type	IP Address
11	ADAMS	Virtual	N/A
12	Mueller	Virtual	N/A
13	ATC	Virtual	N/A
14	TE	Virtual	N/A
15	Virtual 1	Virtual	N/A

The 'Add' button is labeled 'first', the 'Virtual 1' row is labeled 'Second', and the 'Apply' button is labeled 'Third'. The dialog box also includes buttons for 'Connect', 'Disconnect', 'Delete', and 'Restore', along with checkboxes for 'Work Offline' and 'Auto Connect'.

The Windows taskbar shows several open applications: Start, Google - Windo..., Mail - Sent - IBM..., > RE: Lost Foa..., > RE: Lost Foa..., Microsoft Excel, QuoteWerks - [...], EPSON RC+ 5..., and Microsoft Power... The system tray on the right shows a 100% battery level and the time 10:10 AM.

After you click Apply, the screen will change to highlight the Connect Tab.
Click the Connect tab! You will get a hourglass indicating a change is taking place.
You will need to until you get a message!

The screenshot shows the EPSON RC+ 5.4.4 software interface. The main window displays a code editor for 'Main.prg' with the following code:

```
Function main
Long cycleCount

InitRobot

Do
    Jump Start_Pos
    Wait Sw(PartInPos) = On
    Go Desp_1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_2 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_3 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_4 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_5 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_6 Limit = 100
    On Glue_Gun
    Wait .1
    Off Glue_Gun

    cycleCount = cycleCount + 1
    Print "Cycle count: ", cycleCount
```

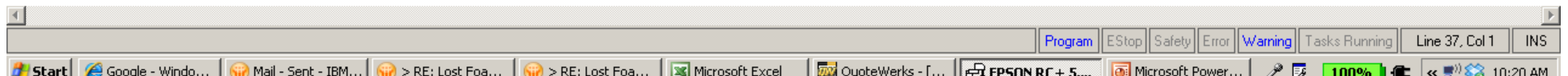
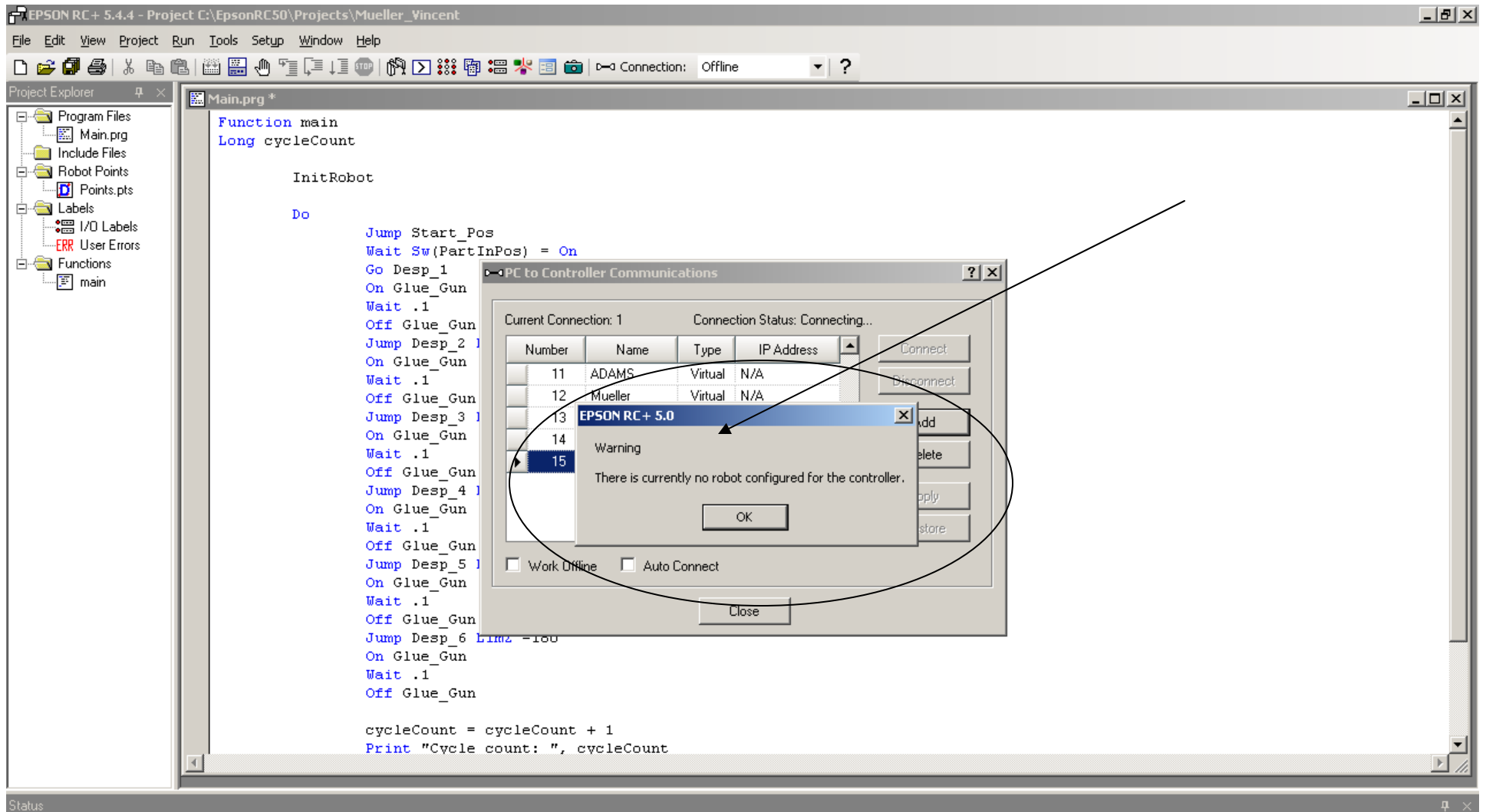
A dialog box titled 'PC to Controller Communications' is overlaid on the code editor. It shows a table of connections:

Number	Name	Type	IP Address
11	ADAMS	Virtual	N/A
12	Mueller	Virtual	N/A
13	ATC	Virtual	N/A
14	TE	Virtual	N/A
15	Mueller_3	Virtual	N/A

The 'Connect' button is highlighted with a mouse cursor. Below the table, there are checkboxes for 'Work Offline' and 'Auto Connect', and a 'Close' button at the bottom.

The Windows taskbar at the bottom of the screen shows the following open applications: Start, Google - Windo..., Mail - Sent - IBM..., > RE: Lost Foa..., > RE: Lost Foa..., Microsoft Excel, QuoteWerks - [...], EPSON RC+ 5..., and Microsoft Power... The system tray on the right shows a 100% battery level, network and volume icons, and the time 10:17 AM.

The message "Warning" There is currently on robot configured for the controller.
Click ok!



You will then be connected to the new controller! The controller will appear in the Connection window, the connect tab will turn gray. You can close this menu!

The screenshot shows the EPSON RC+ 5.4.4 software interface. The main window displays a code editor with the following code:

```
Function main
Long cycleCount

InitRobot

Do
    Jump Start_Pos
    Wait Sw(PartInPos) = On
    Go Desp_1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_2 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_3 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_4 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_5 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_6 Limit = 100
    On Glue_Gun
    Wait .1
    Off Glue_Gun

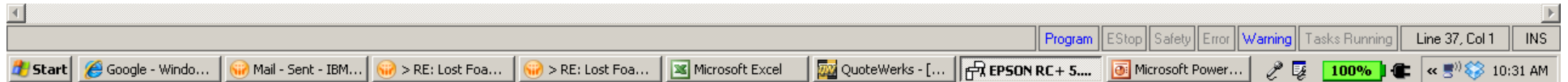
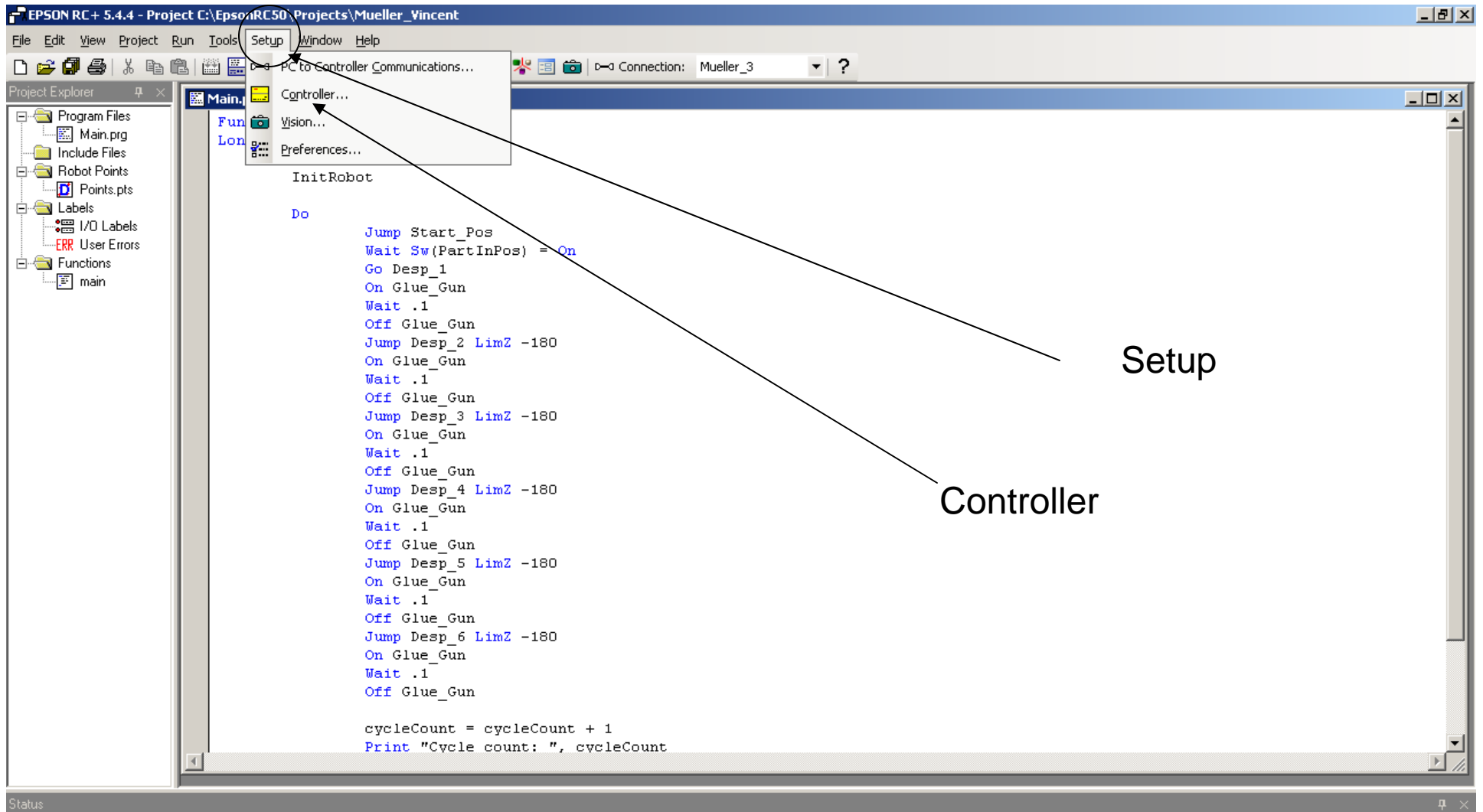
    cycleCount = cycleCount + 1
    Print "Cycle count: ", cycleCount
```

The 'PC to Controller Communications' dialog box is open, showing a table of connections:

Number	Name	Type	IP Address
11	ADAMS	Virtual	N/A
12	Mueller	Virtual	N/A
13	ATC	Virtual	N/A
14	TE	Virtual	N/A
15	Mueller_3	Virtual	N/A

The 'Connect' button is highlighted, and the 'Close' button is also visible. The status bar at the bottom shows 'Program | EStop | Safety | Error | Warning | Tasks Running | Line 37, Col 1 | INS'.

The you will need to go to Setup!
Then click the Controller Tab! You'll need to wait until the next Menu appears.



This is the new Menu that will appear!

The screenshot displays the EPSON RC+ 5.4.4 software interface. The main window is titled "Main.prg *" and contains the following code:

```
Function main
Long cycleCount

InitRobot

Do

Jump Start_Pos
Wait
Setup Controller
Go De
On G1
Wait
Off G
Jump
On G1
Wait
Off G
Jump
On G1
Wait
Off G
Jump
On G1
Wait
Off G
Jump
On G1
Wait
Off G
Jump
On Glue_Gun
Wait .1
Off Glue_Gun

cycleCount = cycleCount + 1
Print "Cycle count: ", cycleCount
```

A "Setup Controller" dialog box is open, showing the "General" tab. The "Controller General" section displays the following information:

- Serial #:
- MAC Address: 00-27-10-78-EA-C8
- Firmware Version: 10.4.0.0
- Date / Time: 4/5/2013 10:33:28 AM
- Project Name:

The dialog box also includes buttons for "Close", "Apply", "Restore", and "Defaults".

The screenshot shows the Windows taskbar at the bottom of the screen. The taskbar includes the Start button, several open applications (Google - Windo..., Mail - Sent - IBM..., > RE: Lost Foa..., Microsoft Excel, QuoteWerks - [...], EPSON RC+ 5..., Microsoft Power...), and the system tray area showing the date and time (10:36 AM) and a 100% battery indicator.

First click the Preferences Tab and check the boxes as shown below!

The screenshot shows the EPSON RC+ 5.4.4 software interface. The main window displays a code editor for 'Main.prg' with the following code:

```
Function main
Long cycleCount

    InitRobot

    Do

        Jump Start_Pos
        Wait
        Go De
        On G1
        Wait
        Off G
        Jump
        On G1
        Wait
        Off G
        Jump
        On G1
        Wait
        Off G
        Jump
        On G1
        Wait
        Off G
        Jump
        On Glue_Gun
        Wait .1
        Off Glue_Gun

        cycleCount = cycleCount + 1
        Print "Cycle count: ", cycleCount
```

The 'Setup Controller' dialog box is open, showing the 'Preferences' tab. The 'Controller Preferences' section has the following checked options:

- Outputs off during emergency stop
- Walk stops for output commands
- Dry run
- Virtual I/O
- Include project files when status exported

The 'Status' bar at the bottom of the software window shows 'Program', 'EStop', 'Safety', 'Error', 'Warning', 'Tasks Running', 'Line 37, Col 1', and 'INS'.

The Windows taskbar is visible at the bottom of the screen. It includes the Start button, several open application windows (Google - Windo..., Mail - Sent - IBM..., > RE: Lost Foa..., Microsoft Excel, QuoteWerks - [...], EPSON RC+ 5..., Microsoft Power...), and the system tray showing 100% battery, network, and system time (10:37 AM).

Then click on the Robot Tab! This will bring up another Menu “Robot Model”, which will allow you to select the robot type from the pull down menu!

The screenshot shows the EPSON RC+ 5.4.4 software interface. The main window displays a ladder logic program for 'Main.prg'. The program includes a 'Function main' with a 'Long cycleCount' variable. The logic starts with 'InitRobot', followed by a 'Do' loop. Inside the loop, there is a 'Jump Start_Pos', a 'Wait' block, and a 'Setup Controller' dialog box. The 'Setup Controller' dialog box is open, showing a tree view on the left with 'Robot' selected. Under 'Robot', the 'Model' sub-item is highlighted. The main area of the dialog shows 'Robot Model' with a dropdown menu currently set to 'None'. To the right of the dialog are buttons for 'Close', 'Apply', 'Restore', and 'Defaults'. The background program code is partially visible, showing 'On G1', 'Wait', 'Off G1', 'Jump', and 'On Glue_Gun' blocks. The status bar at the bottom indicates 'Line 37, Col 1' and 'INS'.

The screenshot shows the Windows taskbar at the bottom of the screen. It includes the Start button, several open application windows (Google - Windo..., Mail - Sent - IBM..., > RE: Lost Foa..., Microsoft Excel, QuoteWerks - [...], EPSON RC+ 5..., Microsoft Power...), and system tray icons for volume, network, and power. The system clock shows 10:40 AM on 10/10/2010.

I selected the G20-A04SR-II. Then click Apply. You will need to wait until the configuration is complete! When complete, the Apply Tab will turn gray and you can close the menu.

The screenshot shows a software interface with a code editor on the left and a 'Setup Controller' dialog box on the right. The code editor contains the following text:

```
Function main
Long cycleCount

  InitRobot

  Do

    Jump Start_Pos
    Wait
    Go De
    On G1
    Wait
    Off G
    Jump
    On G1
    Wait
    Off G
    Jump
    On G1
    Wait
    Off G
    Jump
    On G1
    Wait
    Off G
    Jump
    On G1
    Wait
    Off G
    Jump
    On Glue_Gun
    Wait .1
    Off Glue_Gun

  cycleCount = cycleCount + 1
```

The 'Setup Controller' dialog box has a tree view on the left with the following items:

- General
- Configuration
- Preferences
- Simulator
- Robot
 - Model
 - Configuration
- Inputs / Outputs
- Remote Control
- RS232
- TCP / IP

The 'Robot Model' section on the right contains the following fields:

- Model: G20-A04SR-II (selected in a dropdown menu)
- Type: Scara
- J1 + J2 Length: 1000 mm
- Z Length: 420 mm

Buttons on the right side of the dialog box include 'Close', 'Apply', 'Restore', and 'Defaults'.

When complete, the Apply Tab will turn gray and you can close the menu.

The screenshot shows a software interface for an industrial robot. The main window, titled "Main.prg *", displays the following code:

```
Function main  
Long cycleCount  
  
InitRobot  
  
Do  
  Jump Start_Pos  
  Wait  
  Go De  
  On G1  
  Wait  
  Off G  
  Jump  
  On G1  
  Wait  
  Off G  
  Jump  
  On G1  
  Wait  
  Off G  
  Jump  
  On G1  
  Wait  
  Off G  
  Jump  
  On G1  
  Wait  
  Off G  
  Jump  
  On G1  
  Wait  
  Off G  
  Jump  
  On Glue_Gun  
  Wait .1  
  Off Glue_Gun  
  
  cycleCount = cycleCount + 1  
  Print "Cycle count: ", cycleCount
```

An overlaid dialog box titled "Setup Controller" is active. It features a tree view on the left with the following structure:

- General
- Configuration
- Preferences
- Simulator
- Robot
 - Model (selected)
 - Configuration
- Inputs / Outputs
- Remote Control
- RS232
- TCP / IP

The "Robot Model" section on the right contains the following fields and values:

Parameter	Value
Model:	G20-A04SR-II
Type:	Scara
J1 + J2 Length:	1000 mm
Z Length:	420 mm

Buttons on the right side of the dialog include "Close", "Apply", "Restore", and "Defaults". The "Apply" button is currently grayed out.

Now you'll need to click on the Simulator!

The screenshot shows the EPSON RC+ 5.4.4 software interface. The title bar reads "EPSON RC+ 5.4.4 - Project C:\EpsonRC50\Projects\Mueller_Vincent". The menu bar includes File, Edit, View, Project, Run, Tools, Setup, Window, and Help. The toolbar contains various icons, with a red circle highlighting the simulator icon (a green robot head). The Project Explorer on the left shows a tree view with folders for Program Files, Include Files, Robot Points, Labels, I/O Labels, User Errors, and Functions, with a file named "main" selected under Functions. The main editor window displays the following code for "Main.prg":

```
Function main
Long cycleCount

    InitRobot

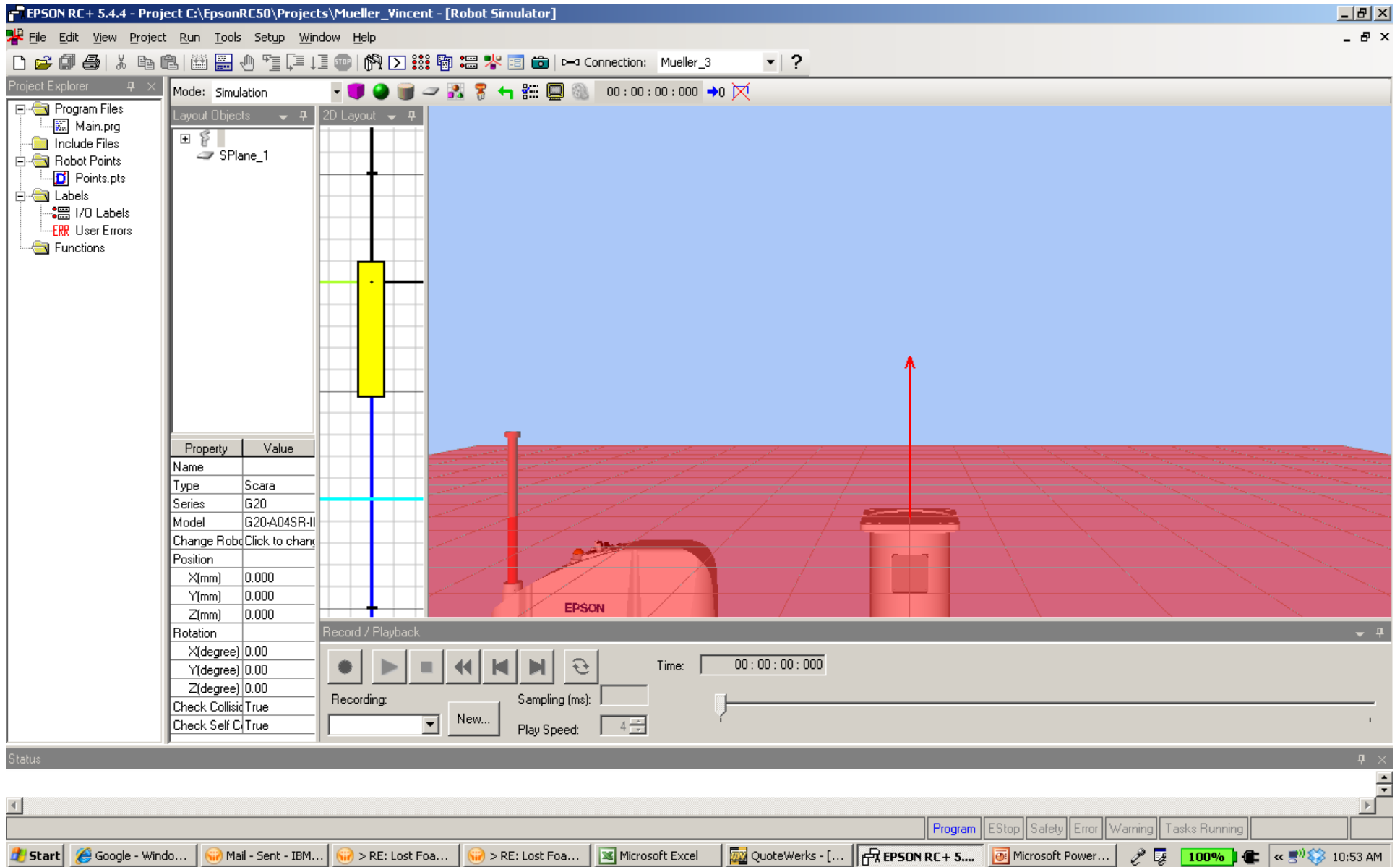
    Do
        Jump Start_Pos
        Wait Sw(PartInPos) = On
        Go Desp_1
        On Glue_Gun
        Wait .1
        Off Glue_Gun
        Jump Desp_2 LimZ -180
        On Glue_Gun
        Wait .1
        Off Glue_Gun
        Jump Desp_3 LimZ -180
        On Glue_Gun
        Wait .1
        Off Glue_Gun
        Jump Desp_4 LimZ -180
        On Glue_Gun
        Wait .1
        Off Glue_Gun
        Jump Desp_5 LimZ -180
        On Glue_Gun
        Wait .1
        Off Glue_Gun
        Jump Desp_6 LimZ -180
        On Glue_Gun
        Wait .1
        Off Glue_Gun

    cycleCount = cycleCount + 1
    Print "Cycle count: ", cycleCount
```

The status bar at the bottom of the window shows "Status".

The screenshot shows the Windows taskbar. The Start button is on the left. Open applications include Google - Windows I..., Mail - Sent - IBM Lo..., > RE: Lost Foam Pl..., > RE: Lost Foam Pl..., Microsoft Excel, QuoteWerks - [Unti..., and EPSON RC+ 5.4.4 ... The system tray on the right shows a 100% battery icon, a network icon, and the time 9:56 AM.

You most likely will get something like this!



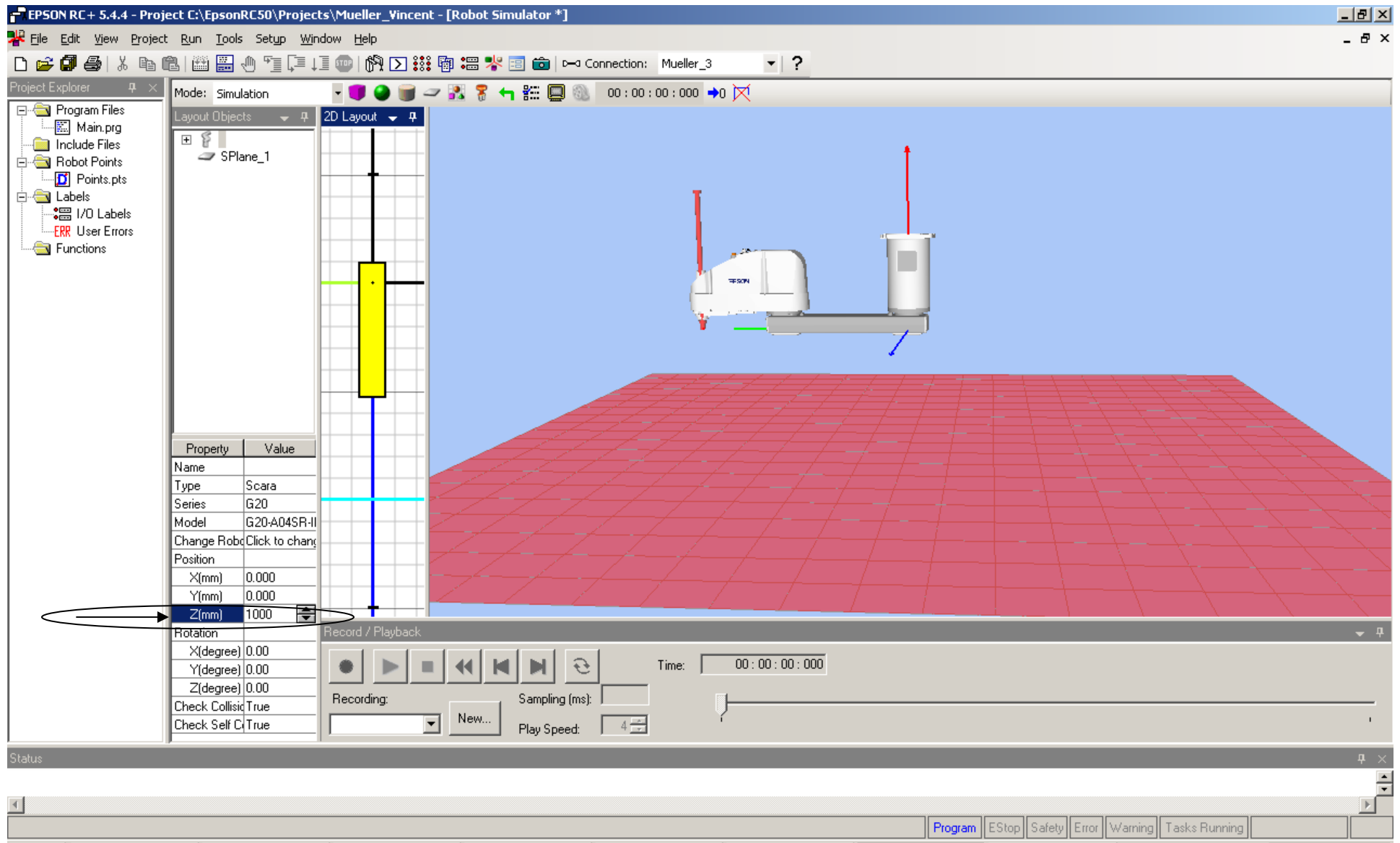
With your mouse, zoom out so you can see a larger work area!
The click on the robot icon, and look at the Z-Axis Position Value.

The screenshot displays the Robot Simulator software interface. The main window is titled "C:\EpsonRC50\Projects\Mueller_Vincent - [Robot Simulator]". The interface includes a menu bar (Run, Tools, Setup, Window, Help), a toolbar, and a status bar. The main workspace is divided into two views: a 2D Layout view on the left and a 3D view on the right. The 2D Layout view shows a yellow rectangular robot icon on a grid. The 3D view shows a red grid floor with a red robot model. A red arrow points from the robot icon in the 2D view to the robot model in the 3D view. A table in the bottom-left corner shows the robot's properties, with the Z-axis position value highlighted. The table is as follows:

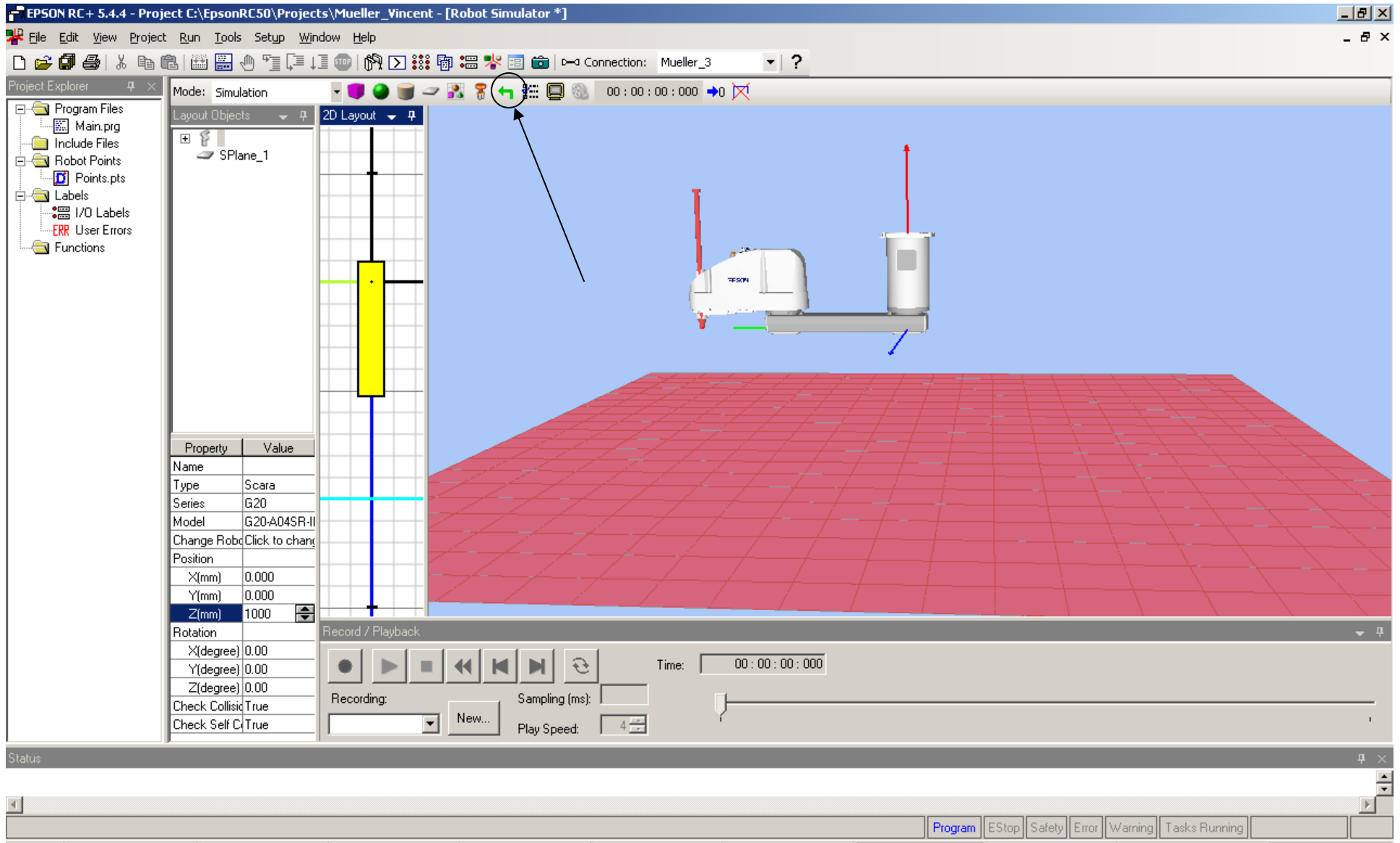
Property	Value
Name	
Type	Scara
Series	G20
Model	G20-A04SR-II
Change Robc	Click to chang
Position	
X(mm)	0.000
Y(mm)	0.000
Z(mm)	0.000
Rotation	
X(degree)	0.00
Y(degree)	0.00
Z(degree)	0.00
Check Collisid	True
Check Self C	True

The bottom of the interface features a "Record / Playback" section with a time display (00:00:00:000) and various control buttons for recording and playback.

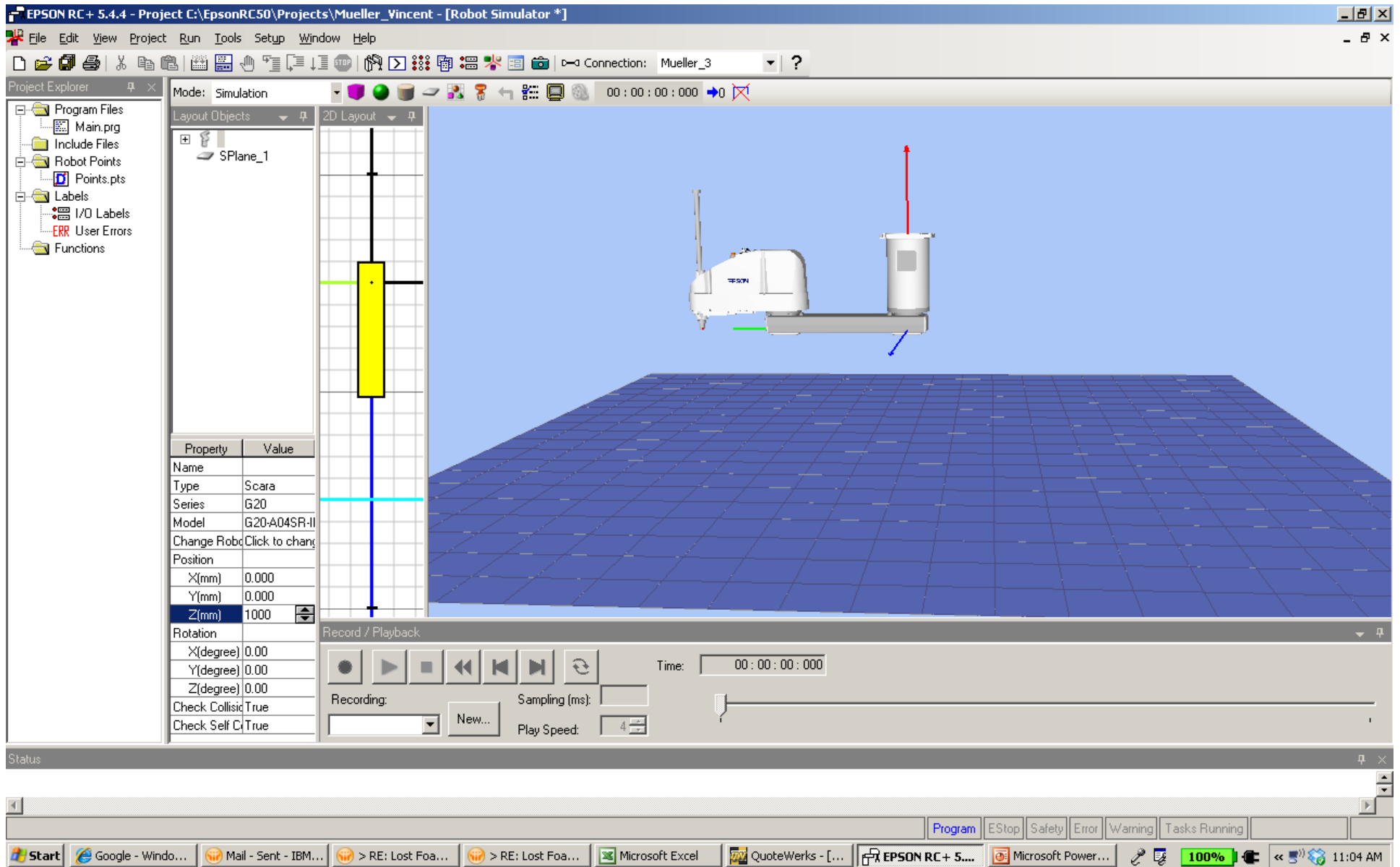
Change the Robot's position by clicking on the Z-Value as shown below.
Change to 1000.



Then click on the “Reset Collision” icon to clear the Red collision indicator!

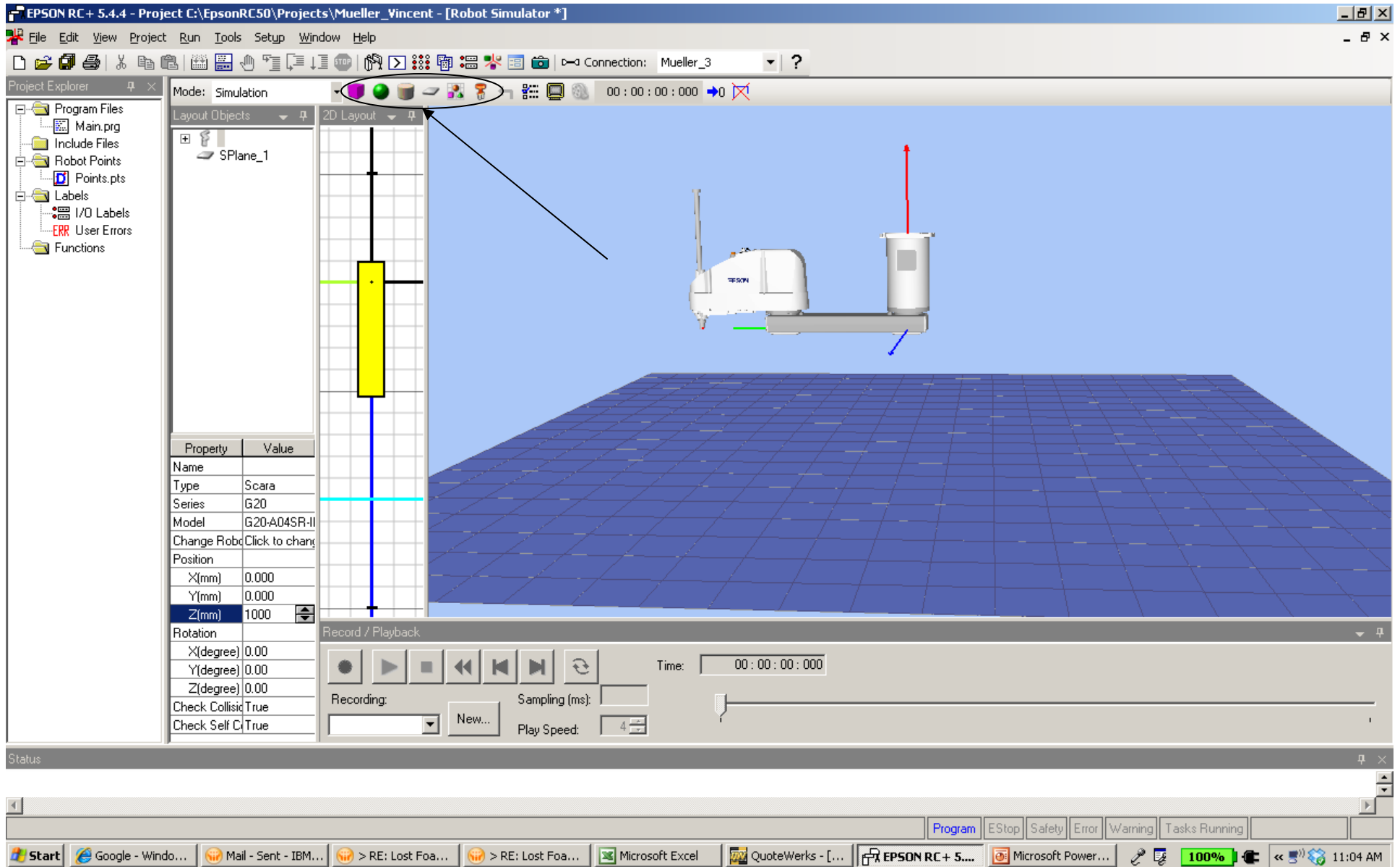


“Reset Collision” will clear the Red collision indicator and turn objects and robot to normal colors!

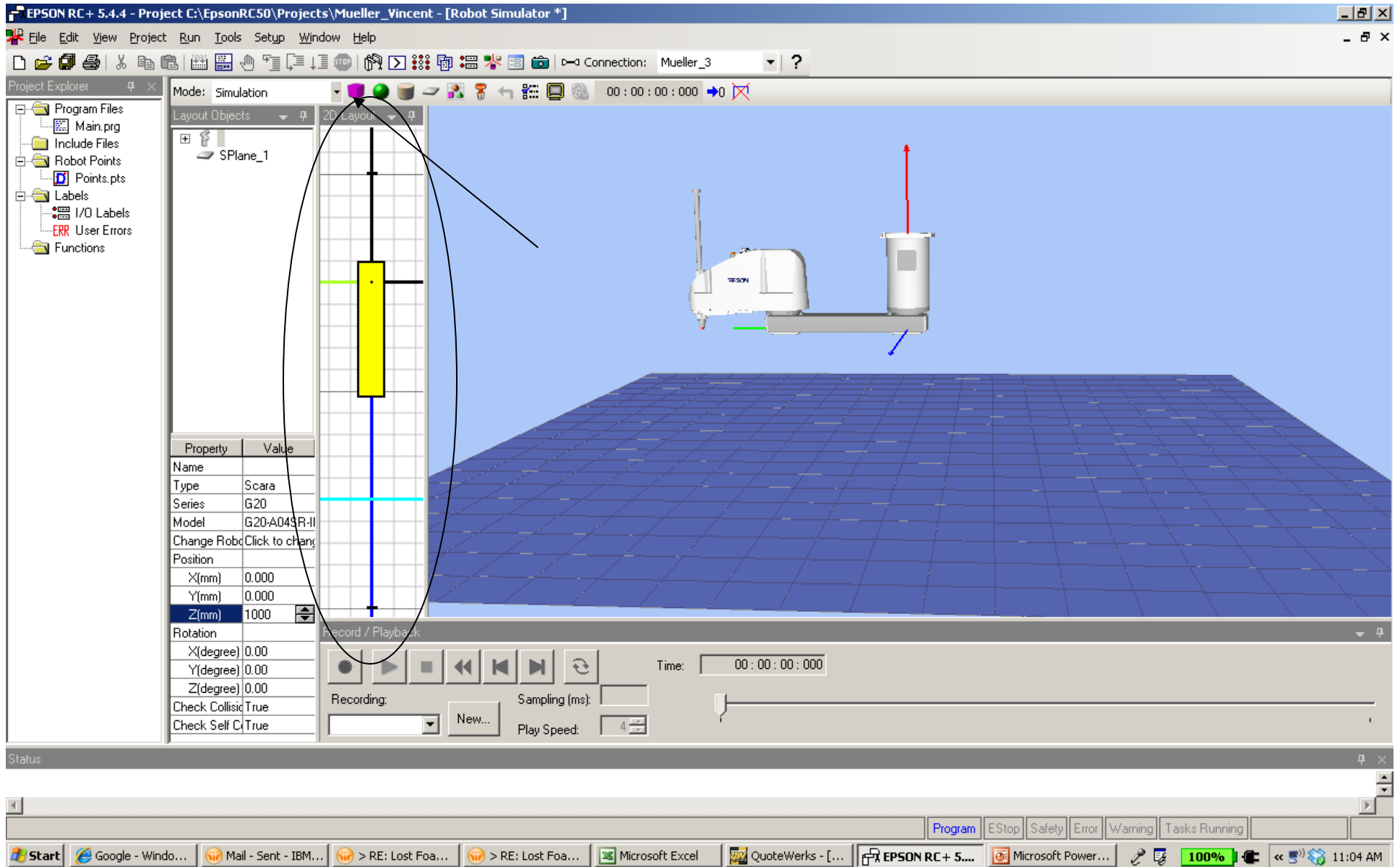


Now we are ready to create objects in the work area.

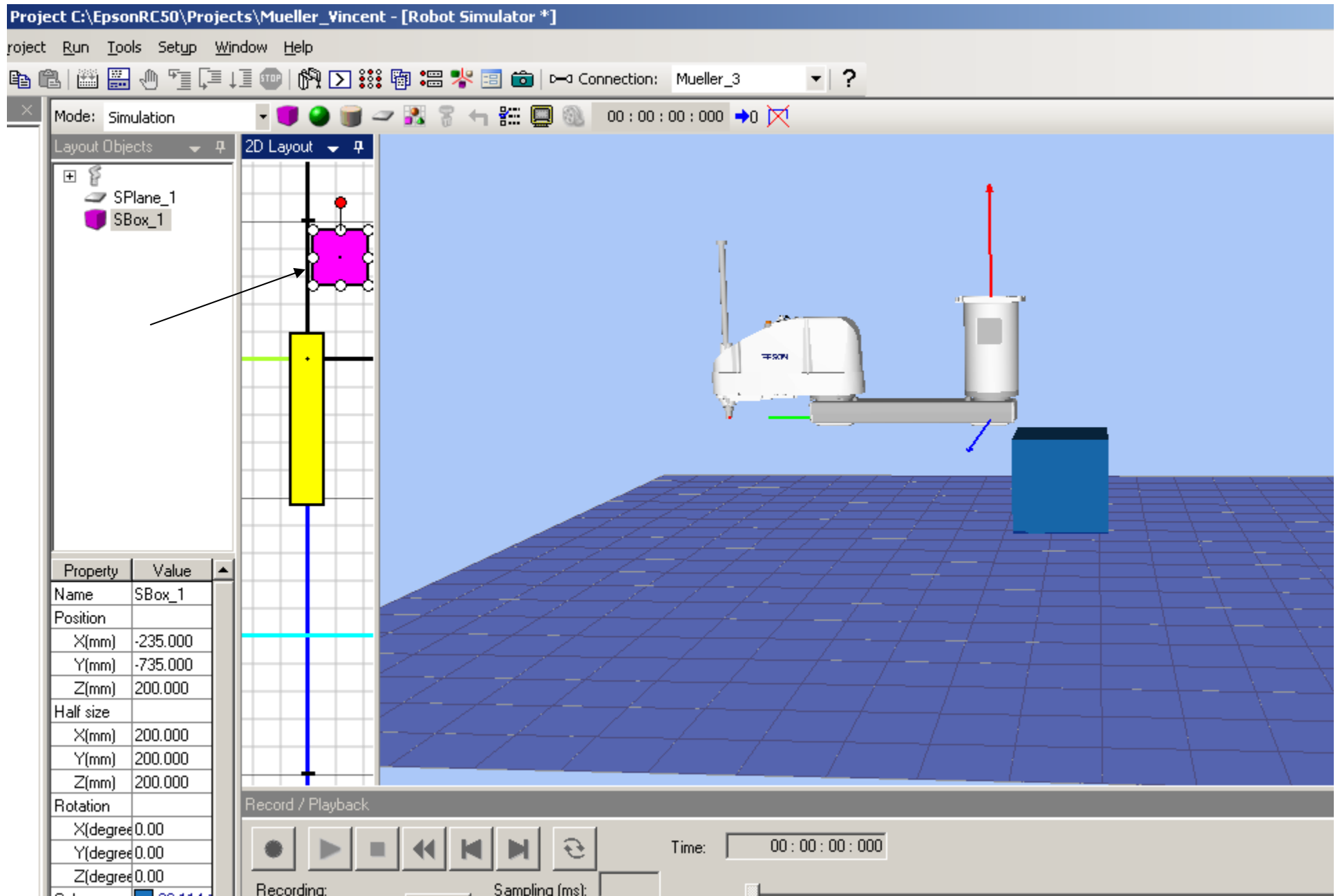
These are the tools we have to work with.



Create an object in the work area to interact with the robot. Select the Layout Box to create a pallet by clicking and holding the Layout Box icon while dragging it into the 2D Layout, shown below in the circle area, then release.



This will put the Layout Box in both the 2D & 3D Layouts. Working from the 2D layout you can click on the Layout Box and allow you to move this object.



Note the Name under Value under the property for the Layout Box; SBox_1. You can change this to any name you like, in this case I'll change it to Pallet_1

Project C:\EpsonRC50\Projects\Mueller_Vincent - [Robot Simulator *]

Project Run Tools Setup Window Help

Connection: Mueller_3

Mode: Simulation 00:00:00:000

Layout Objects

- SPlane_1
- SBox_1

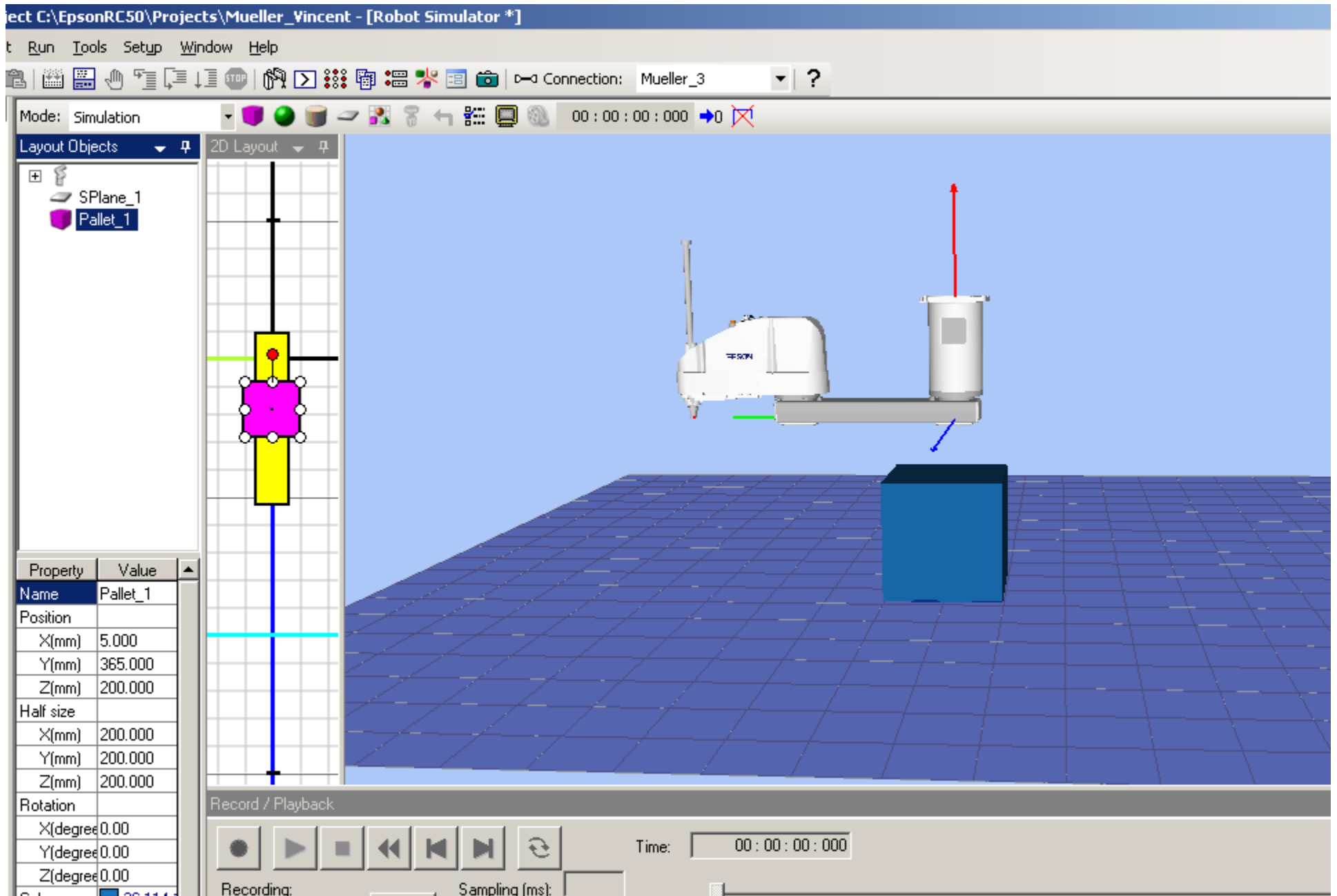
Property	Value
Name	SBox_1
Position	
X(mm)	-235.000
Y(mm)	-735.000
Z(mm)	200.000
Half size	
X(mm)	200.000
Y(mm)	200.000
Z(mm)	200.000
Rotation	
X(degree)	0.00
Y(degree)	0.00
Z(degree)	0.00

Record / Playback

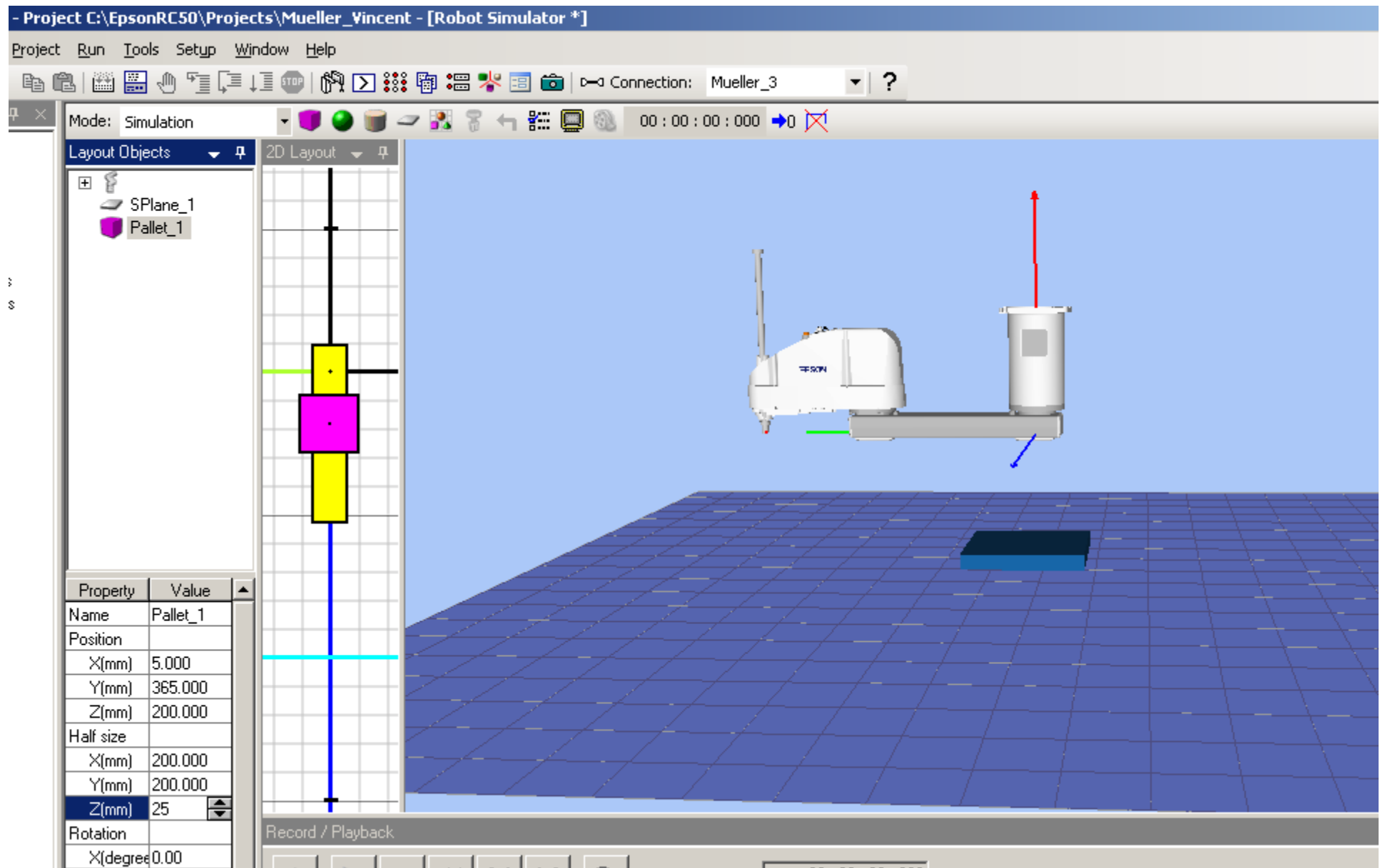
Time: 00:00:00:000

Recording: Sampling (ms):

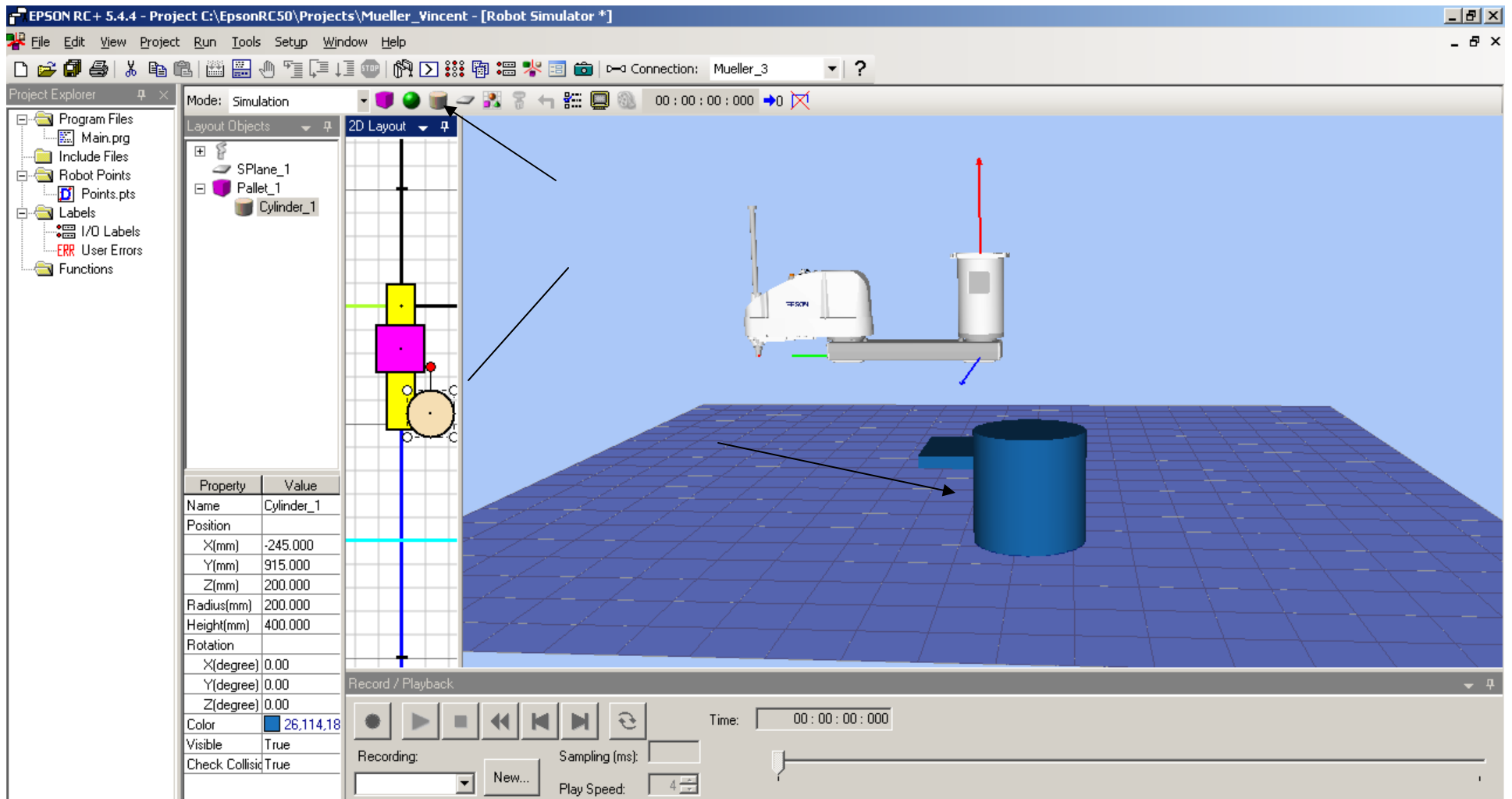
Move the Pallet in front of the robots and within it's work envelope as shown below!
Now we can resize the pallet. Make sure to click on the 2D object for the Property values.



Click on the Z under the Half Size property, change the Value to 25. Note the changes to the object.



Now lets create another object, by selecting the Layout Cylinder and dragging the Layout Cylinder into the 2D Layout area.
Note before doing this make sure that the Pallet object is highlighted so the cylinder object will be associated with the pallet.



Now lets change the Values of the Cylinder; Radius, Height & Color. See below!

The screenshot shows a robot simulator interface. The main window displays a 3D view of a robot on a blue grid floor. A red arrow points upwards from the robot's base, and a blue arrow points downwards from the robot's base to a yellow cylinder on the floor. The 2D layout view on the left shows a yellow cylinder with a red dot in the center, representing the robot's position. The cylinder's properties are listed in a table below.

Property	Value
Name	Cylinder_1
Position	
X(mm)	-235.000
Y(mm)	615.000
Z(mm)	200.000
Radius(mm)	25
Height(mm)	50
Rotation	
X(degree)	0.00
Y(degree)	0.00
Z(degree)	0.00
Color	Yellow
Visible	True
Check Collision	True

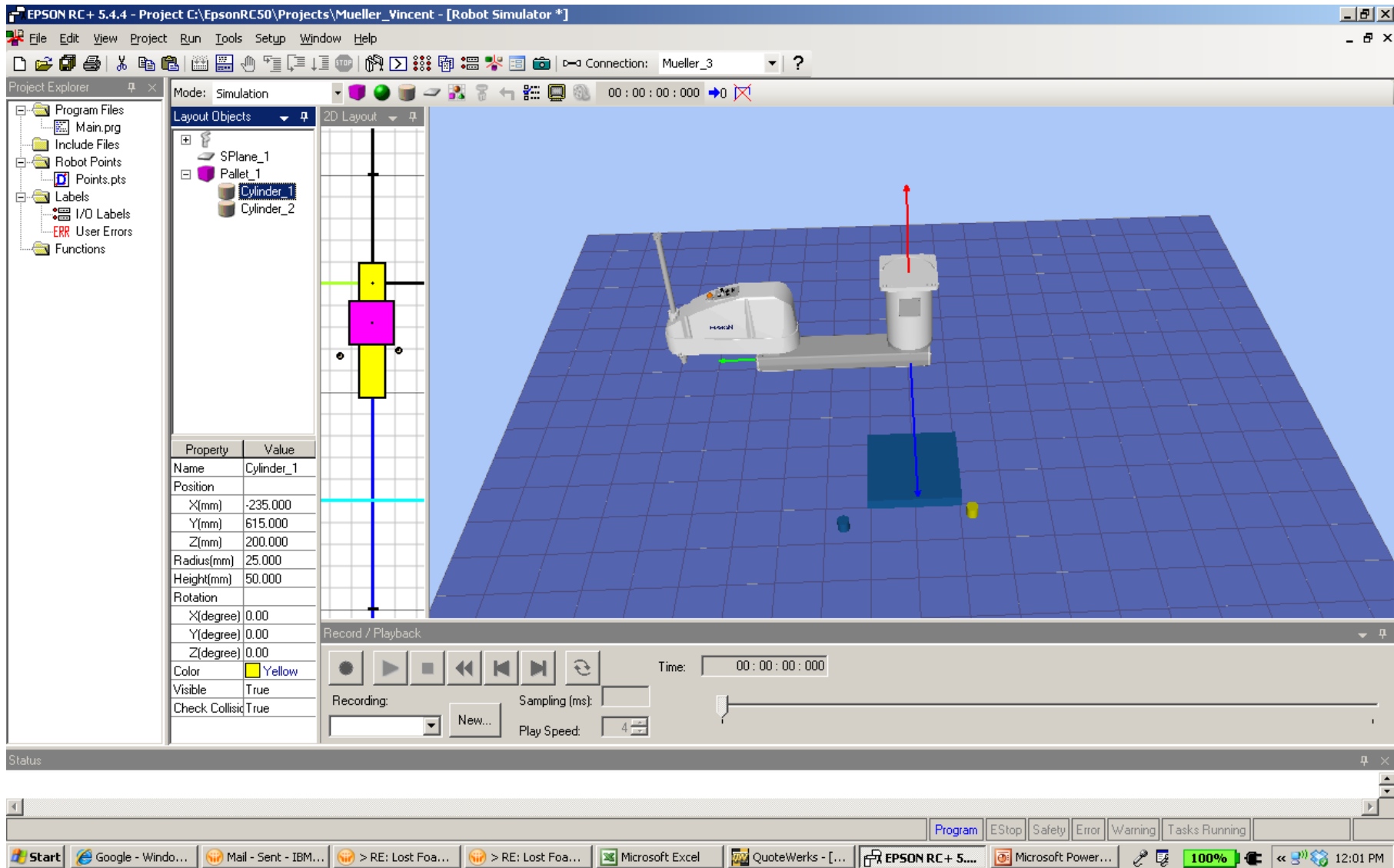
Record / Playback

Time: 00 : 00 : 00 : 000

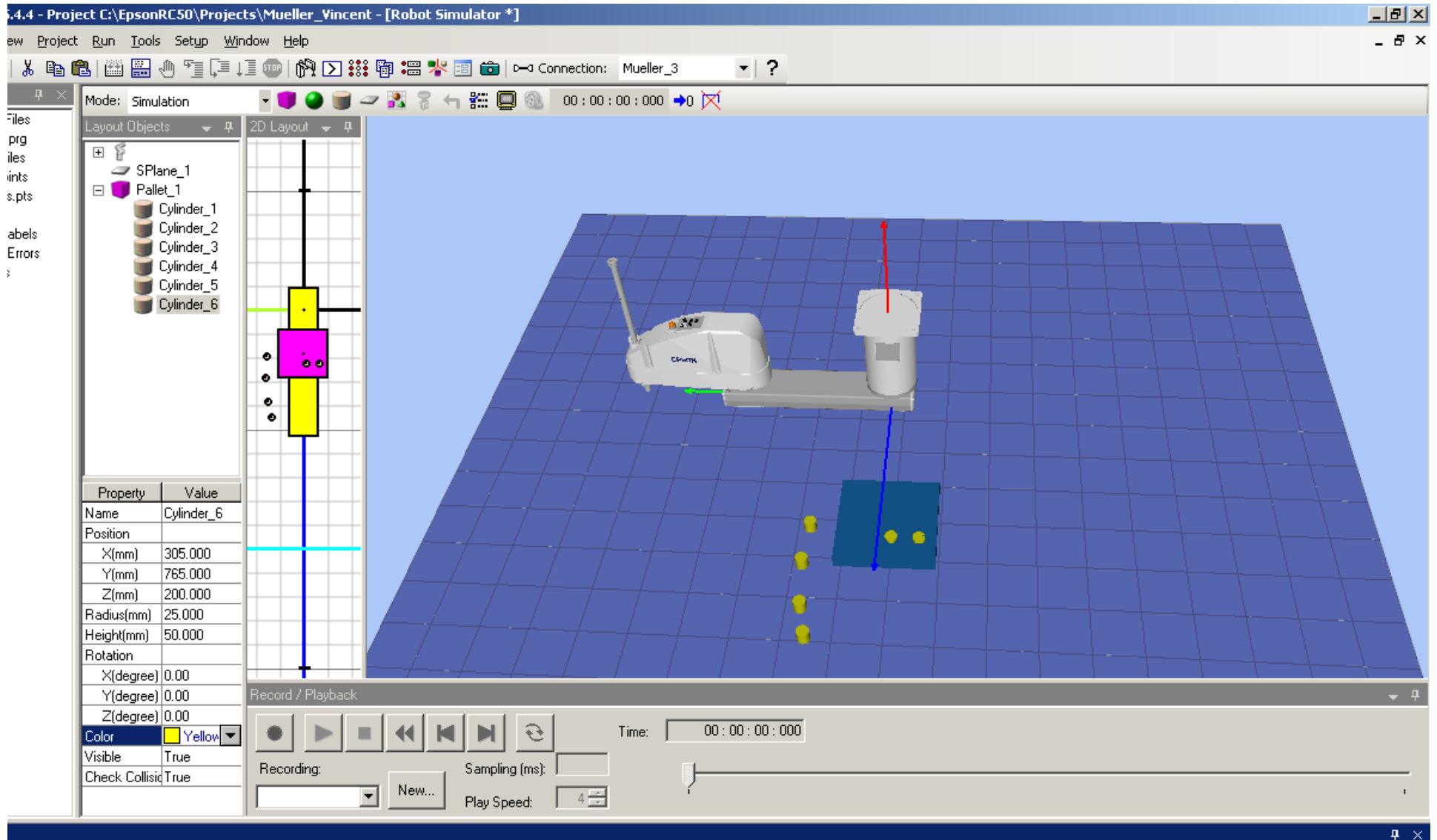
Recording: [] Sampling (ms): []

Play Speed: 4

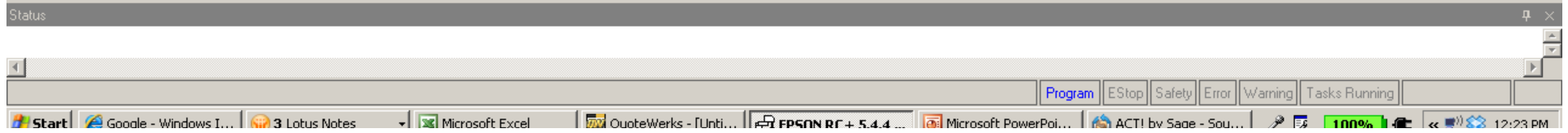
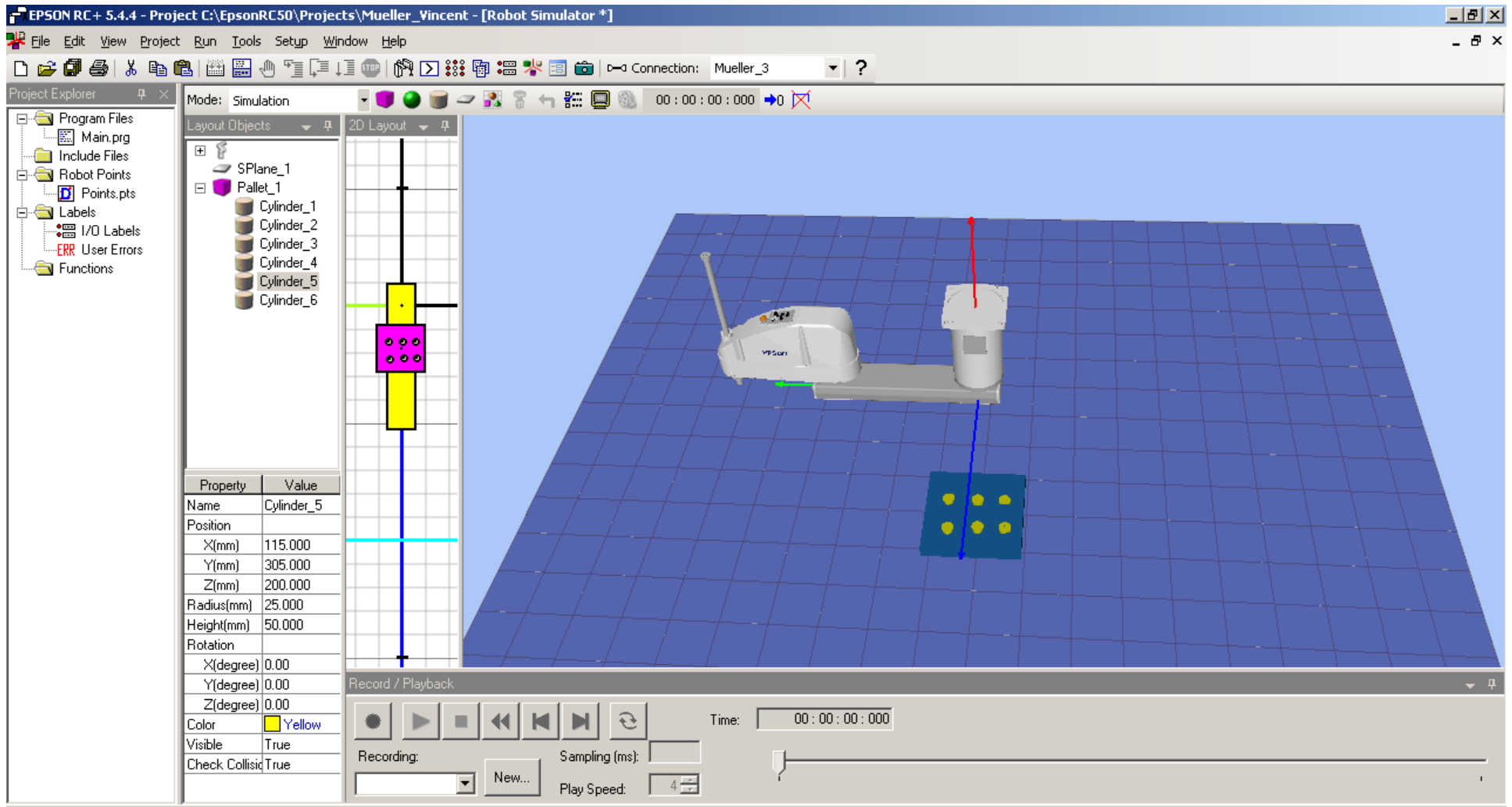
After you have created the first cylinder, you can copy it by highlighting cylinder_1, Clicking “Ctrl” “C”, then click pallet_1 to highlight and then use “Ctrl” “V” to paste as many cylinders as you need. In this case I used 6 cylinders. Note you will have to Change the color for each cylinder. See next page.



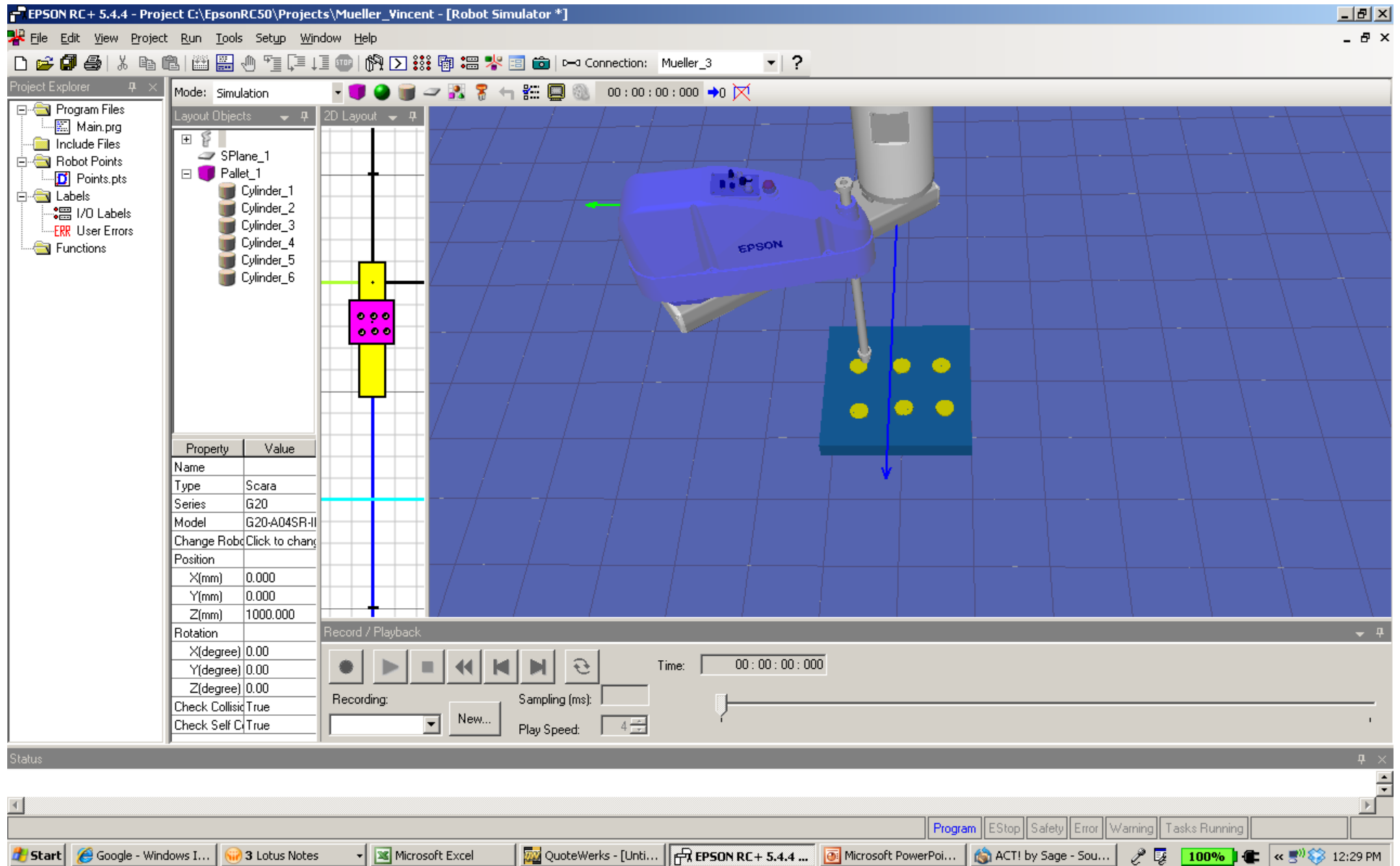
Then you will have to move each cylinder, the easiest way is to click on the object in the 2D Layout and move the object. Note that when pasting the cylinders they may paste on top of each other but you can still click on the cylinder in the 2D layout and Move the objects, one at a time. See next page.



Now that we have moved the cylinder object onto the pallet we are ready to teach The robot points.

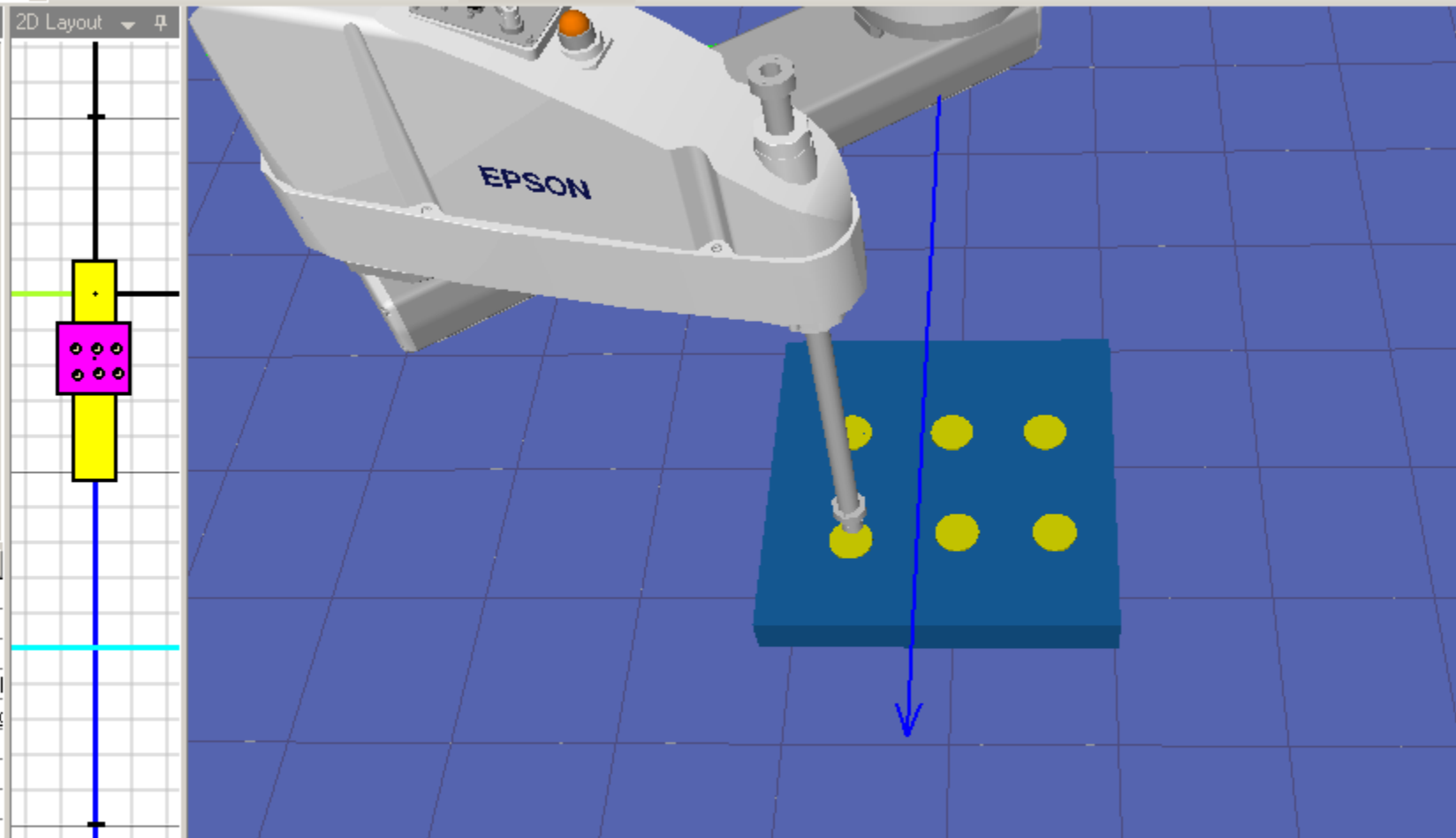


To move the robot arm you can use the “Ctrl” key and left click your mouse.
Note only one Axis at a time is allowed.
Or you can use the Jog & Teach, see next page.



- SPane_1
- Pallet_1
 - Cylinder_1
 - Cylinder_2
 - Cylinder_3
 - Cylinder_4
 - Cylinder_5
 - Cylinder_6

Property	Value
Name	
Type	Scara
Series	G20
Model	G20-A04SR-II
Change Robo	Click to chang
Position	
X(mm)	0.000
Y(mm)	0.000
Z(mm)	1000.000
Rotation	
X(degree)	0.00
Y(degree)	0.00
Z(degree)	0.00
Check Collisic	True
Check Self C	True



Record / Playback

Time: 00 : 00 : 00 : 000

Recording: [New...] Sampling (ms): []

Play Speed: 4x

Click on the Robot icon!

The screenshot displays the EPSON RC+ 5.4.4 software interface. The main window is titled "EPSON RC+ 5.4.4 - Project C:\EpsonRC50\Projects\Mueller_Vinrent". The interface includes a menu bar (File, Edit, View, Project, Run, Tools, Setup, Window, Help), a toolbar, and a connection dropdown menu set to "Mueller_3".

The "Robot Manager" window is open, showing a control panel with the following sections:

- Status:** Emergency Stop: OFF, Safeguard: OFF, Motors: OFF, Power: LOW
- Motors:** MOTOR OFF (green button), MOTOR ON (grey button)
- Free Joints:** J1, J2, J3, J4 (checkboxes), Free All, Lock All, Reset, Home (buttons)
- Power:** POWER LOW, POWER HIGH (buttons)

The 3D view shows a white robot arm on a blue grid. The time display is 00:00:00:000. The bottom status bar shows "Status".

The Project Explorer on the left shows a tree view with folders like Program Files, Include Files, Robot Points, Labels, I/O Labels, User Errors, and Functions.

The code editor at the bottom contains the following code:

```
Wait .1
Off Glue_Gun
Jump Desp_6 LimZ -180
On Glue_Gun
Wait .1
Off Glue_Gun

cycleCount = cycleCount + 1
Print "Cycle count: ", cycleCount
```

The Windows taskbar at the bottom shows the Start button and several open applications: Google - Windows I..., 3 Lotus Notes, Microsoft Excel, QuoteWerks - [Unti..., EPSON RC+ 5.4.4 ..., and Microsoft PowerPoi... The system tray on the right shows the time as 12:32 PM and a 100% battery indicator.

Click on the "Motor On"

The screenshot displays the EPSON RC+ 5.4.4 software interface. The main window is titled "Robot Manager" and features a control panel with several sections:

- Status:** Emergency Stop: OFF, Safeguard: OFF, Motors: ON, Power: LOW
- Motors:** A "MOTOR OFF" button and a highlighted "MOTOR ON" button.
- Free Joints:** Checkboxes for J1, J2, J3, and J4, with "Free All" and "Lock All" buttons.
- Power:** "POWER LOW" and "POWER HIGH" buttons.

A 3D simulation of a robot arm is visible on the right side of the interface. Below the control panel, a code editor shows the following program code:

```
Wait .1
Off Glue_Gun
Jump Desp_6 LimZ -180
On Glue_Gun
Wait .1
Off Glue_Gun

cycleCount = cycleCount + 1
Print "Cycle count: ", cycleCount
```

The Windows taskbar at the bottom shows the Start button and several open applications: Google - Windows I..., 3 Lotus Notes, Microsoft Excel, QuoteWerks - [Unti..., EPSON RC+ 5.4.4 ..., Microsoft PowerPoi..., and ACT! by Sage - Sou... The system tray indicates 100% battery and the time is 12:34 PM.

Click on the Jog & Teach Tab

The screenshot displays the EPSON RC+ 5.4.4 software interface. The main window is titled "EPSON RC+ 5.4.4 - Project C:\EpsonRC50\Projects\Mueller_Vincent". The "Robot Manager" window is open, showing the "Jog & Teach" tab selected in the "Control Panel".

The "Jogging" section includes:

- Mode: World
- Speed: Low
- Local: 0, Tool: 0, Arm: 0, ECP: 0
- Current Position: X (mm) 94.913, Y (mm) 291.935, Z (mm) -319.655
- U (deg) 187.500, V (deg), W (deg)
- Current Arm Orientation: Hand (Righty), Elbow, Wrist, J4Flag, J6Flag
- Jog Distance: X (mm) 1.000, Y (mm) 1.000, Z (mm) 1.000; U (deg) 1.000, V (deg), W (deg)
- Execute Motion Command: Command: Move, Execute
- Teach Points: Point File: Points.pts, Point: P0 - (undefined)

The 3D visualization shows a robot arm on a blue grid. The time display is 00:00:00:000.

The command window contains the following code:

```
Wait .1
Off Glue_Gun
Jump Desp_6 LimZ -180
On Glue_Gun
Wait .1
Off Glue_Gun

cycleCount = cycleCount + 1
Print "Cycle count: ", cycleCount
```

The Windows taskbar shows the Start button and several open applications: Google - Windows I..., 3 Lotus Notes, Microsoft Excel, QuoteWerks - [Unti..., EPSON RC+ 5.4.4 ..., and Microsoft PowerPoi... The system tray shows the time 12:36 PM and a 100% battery indicator.

Using the directional buttons move the robot.

The screenshot displays the EPSON RC+ 5.4.4 software interface. The main window is titled "EPSON RC+ 5.4.4 - Project C:\EpsonRC50\Projects\Mueller_Vincent". The interface includes a menu bar (File, Edit, View, Project, Run, Tools, Setup, Window, Help), a toolbar, and a Project Explorer on the left. The central "Robot Manager" window is divided into several sections:

- Control Panel:** Includes "Jogging" mode (set to "World") and speed (set to "Low"). A circular callout highlights the directional buttons: +X, -Y, +Z, -X, +Y, -Z, -U, -V, -W, +U, +V, +W.
- Current Position:** Displays X (94.913 mm), Y (291.935 mm), and Z (-319.655 mm) coordinates. It also shows orientation angles U, V, and W.
- Current Arm Orientation:** Shows settings for Hand (Righty), Elbow, and Wrist, along with J4Flag and J6Flag checkboxes.
- Jog Distance:** Allows setting distances for X, Y, and Z (all set to 1.000 mm) and orientation angles U, V, and W (all set to 1.000 deg). It includes radio buttons for Continuous, Long, Medium, and Short jog modes.
- Execute Motion Command:** Features a "Command" dropdown set to "Move" and an "Execute" button.
- Teach Points:** Includes a "Point File" dropdown set to "Points.pts" and a "Point" dropdown set to "P0 - (undefined)".

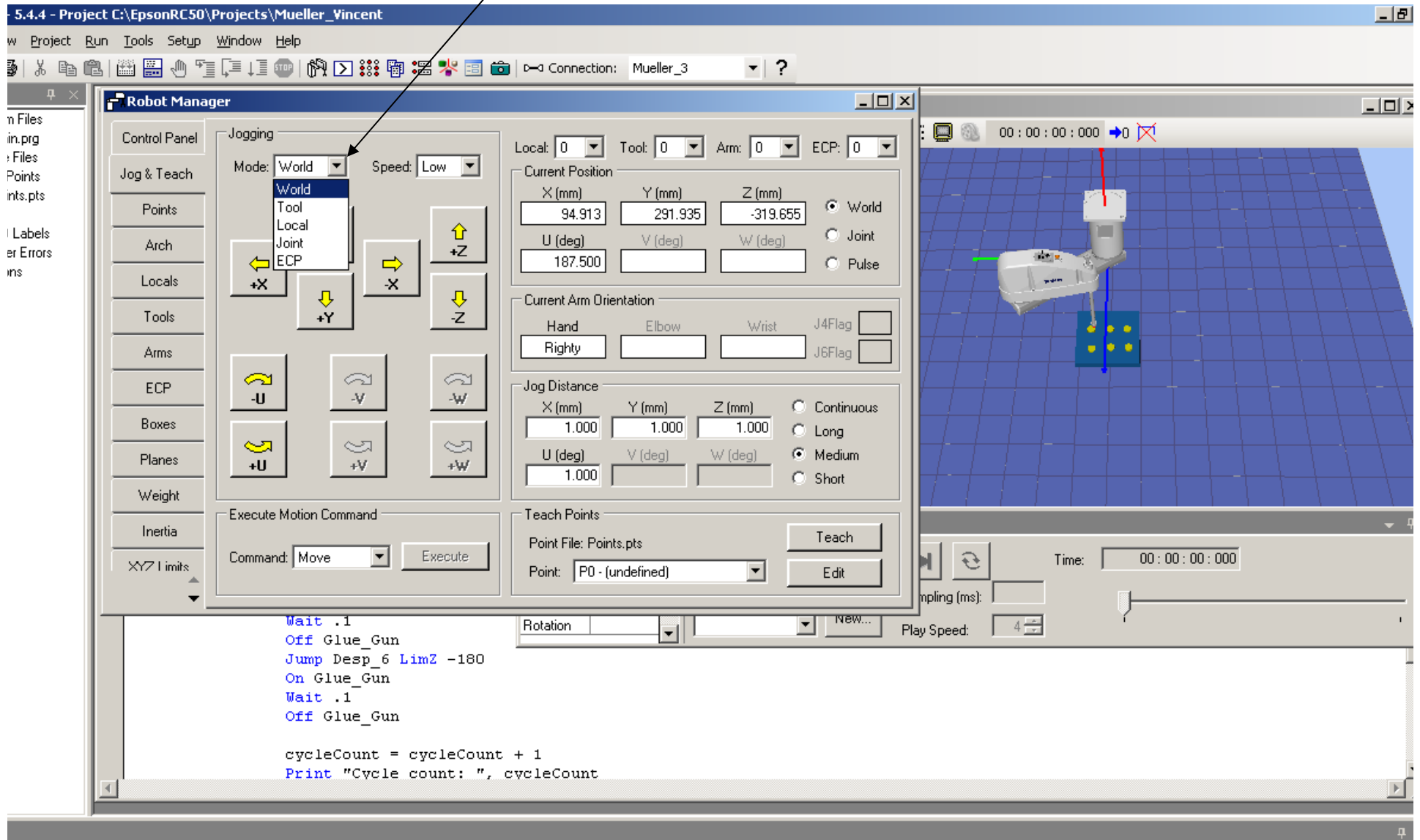
At the bottom of the Robot Manager window, a code editor shows the following program code:

```
Wait .1
Off Glue_Gun
Jump Desp_6 LimZ -180
On Glue_Gun
Wait .1
Off Glue_Gun

cycleCount = cycleCount + 1
Print "Cycle count: ", cycleCount
```

The right side of the interface features a 3D simulation of the robot arm on a blue grid. A timer at the top right shows "00:00:00:000" with a play button. Below the simulation, there are controls for "Sampling (ms)", "Play Speed" (set to 4), and a "Time" display set to "00:00:00:000".

You can select the method of moving the robot by using the pull down menu.



You can also select the type of move the robot makes by using the Jog Dist.

The screenshot displays the Robot Manager software interface. The main window is titled "5.4.4 - Project C:\EpsonRC50\Projects\Mueller_Vincent". The interface includes a menu bar (File, Project, Run, Tools, Setup, Window, Help), a toolbar, and a connection dropdown set to "Mueller_3".

The "Robot Manager" panel is open, showing the "Jogging" section. The "Mode" is set to "World" and "Speed" is "Low". The "Jog Distance" section is highlighted with a red circle, showing the following settings:

- X (mm): 1.000
- Y (mm): 1.000
- Z (mm): 1.000
- U (deg): 1.000
- V (deg):
- W (deg):

The "Jog Distance" section also includes radio buttons for "Continuous", "Long", "Medium", and "Short". The "Medium" option is selected. The "Execute Motion Command" section shows "Command: Move" and an "Execute" button. The "Teach Points" section shows "Point File: Points.pts" and "Point: P0 - (undefined)".

The main workspace shows a 3D view of a robot arm on a blue grid. The robot arm is positioned over a blue square with four yellow dots. The "Time" display shows "00:00:00:000".

```
Wait .1
Off Glue_Gun
Jump Desp_6 LimZ -180
On Glue_Gun
Wait .1
Off Glue_Gun

cycleCount = cycleCount + 1
Print "Cycle count: ", cycleCount
```

Because we did not use a template, we will need to enter the point names as they are in the program code. For example “Start” & “Desp_1” are positions or points that we need to teach. The easy way is to copy & paste the names for the program to the Points Menu or you can type the name. So copy or enter Start, Desp_1 through Desp_6 . See next page.

The screenshot displays the EPSON RC+ 5.4.4 software interface. The main window shows a program file named 'Main.prg' with the following code:

```
Function main
Long cycleCount

InitRobot

Do
    Jump Start_Pos
    Wait Sw(PartInPos) = On
    Go Desp_1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_2 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_3 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_4 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_5 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_6 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun

    cycleCount = cycleCount + 1
    Print "Cycle count: ", cycleCount
```

The 'Robot Manager' window is open, showing a table of points. The 'Points' menu is selected, and the table contains the following data:

Number	Name	X	Y	Z	U	Local	Hand
0							
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							

The 'copy' text is positioned over the code, with arrows pointing to the 'Jump Start_Pos' and 'Jump Desp_1' lines, indicating the source of the point names to be entered into the Robot Manager table.

After you enter the points name, then we need to save our information for this project.
Click on this icon, Save All Files!
Now teach the points by moving the robot to each position and teach. See next page.

The screenshot displays the EPSON RC+ 5.4.4 software interface. The main window shows a program editor with the following code:

```
Function main
Long cycleCount

InitRobot

Do
    Jump Start_Pos
    Wait Sw(PartInPos) = On
    Go Desp_1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_2 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_3 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_4 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_5 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_6 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun

    cycleCount = cycleCount + 1
    Print "Cycle count: ", cycleCount
```

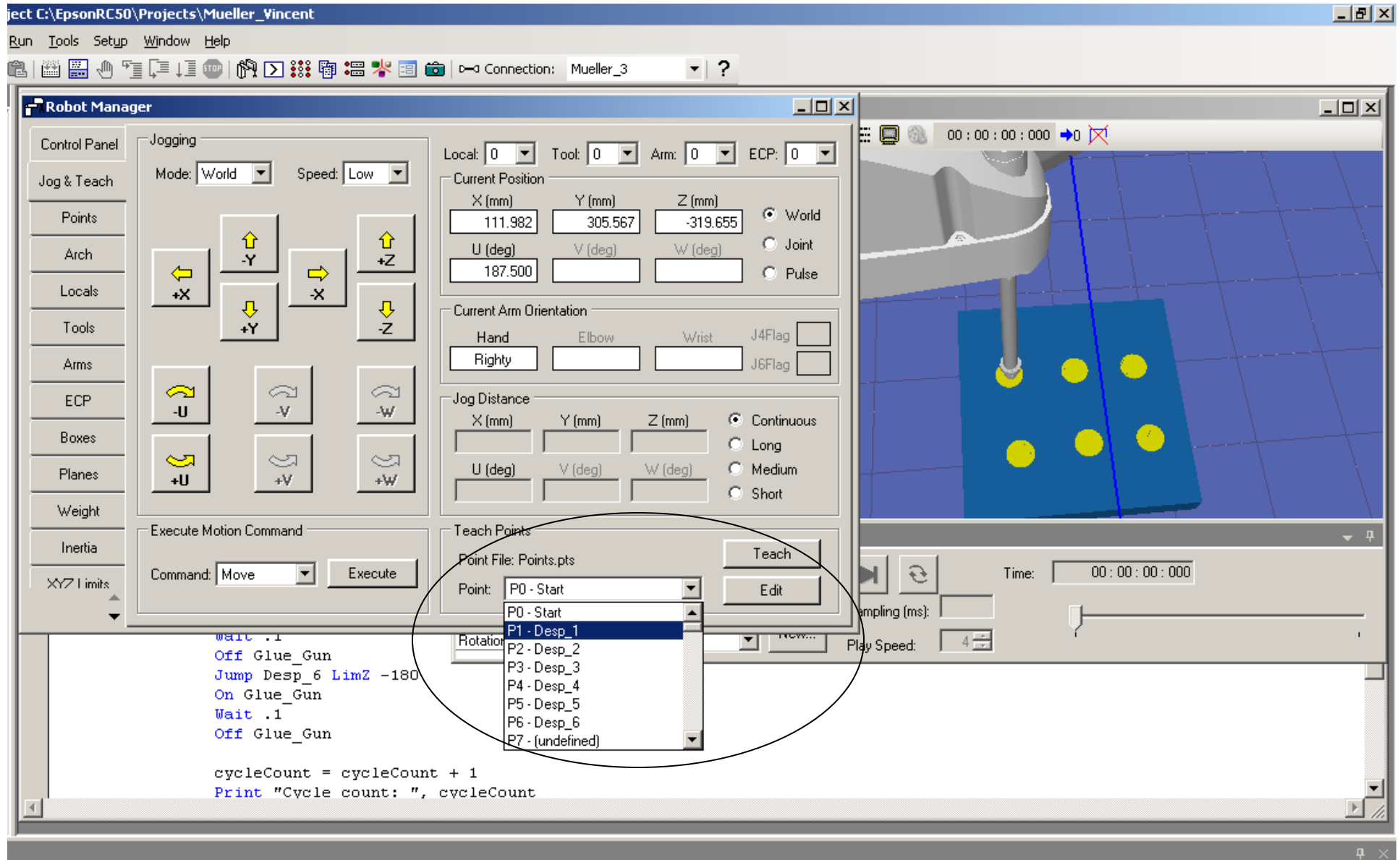
The Robot Manager dialog box is open, showing a table of points. The 'Point File' is set to 'Points.pts'. The table contains the following data:

Number	Name	X	Y	Z	U	Local	Hand
0	Start	0.000	0.000	0.000	0.000	0	Righty
1	Desp_1					0	
2	Desp_2					0	
3	Desp_3					0	
4	Desp_4					0	
5	Desp_5					0	
6	Desp_6					0	
7							
8							
9							
10							
11							
12							
13							
14							

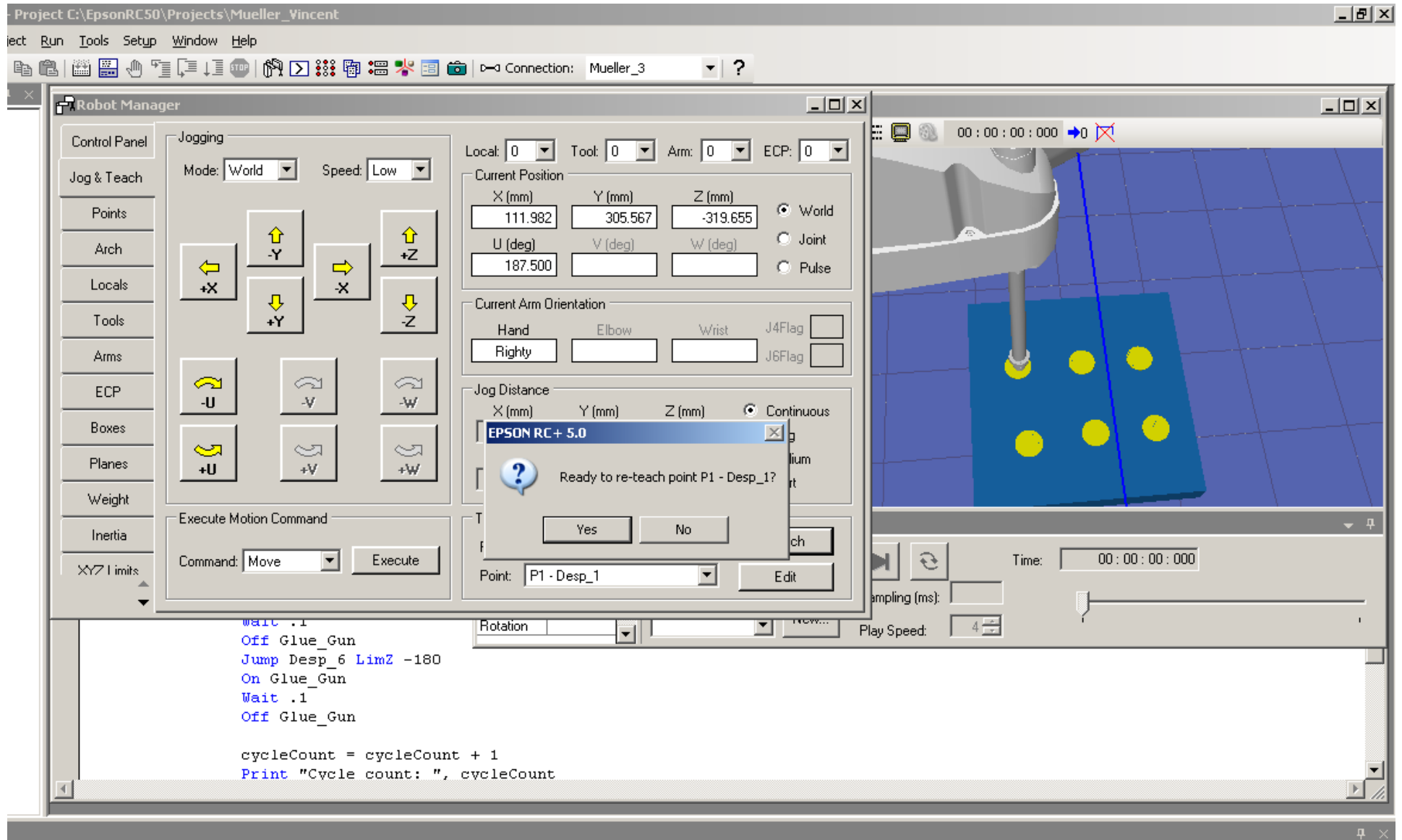
The 'Planes' tab is selected, and point 11 is highlighted. The dialog box also includes buttons for 'Delete P11', 'Delete All', 'Save', and 'Restore'.

The Windows taskbar at the bottom of the screen shows the following open applications: Start, Google - Windows I..., 3 Lotus Notes, Microsoft Excel, QuoteWerks - [Unti..., EPSON RC+ 5.4.4 ..., and Microsoft PowerPoi... The system tray on the right displays the time as 1:13 PM and the battery level at 100%.

To teach Desp_1 position, move the robot to Desp_1 position, click on the pull down
And click on Desp_1, this will highlight the name.



After you click teach and menu will appear, asking you if you are Reach to re-tech point. Click Yes! Repeat process for each point.



Note, for the Start Position, I only moved the Z-Axis up to a position above the Desp_1 position.

The screenshot displays a robotic control software interface. At the top, the window title is "Projects\Mueller_Vincent". Below the title bar, there is a menu bar with "Window" and "Help", and a toolbar with various icons. The main interface is divided into several sections:

- Jogging:** Includes a "Mode" dropdown set to "World" and a "Speed" dropdown set to "High". It features a grid of directional buttons: +X, -Y, +Z, -X, +Y, -Z, -U, -V, -W, +U, +V, +W.
- Current Position:** Shows coordinates for X (mm), Y (mm), and Z (mm). The Z-axis value is -110.564. It also includes fields for U (deg), V (deg), and W (deg).
- Current Arm Orientation:** Displays "Hand" as "Righty" and includes checkboxes for "J4Flag" and "J6Flag".
- Jog Distance:** Provides input fields for X, Y, and Z (mm), and U, V, and W (deg). It includes radio buttons for "Continuous", "Long", "Medium", and "Short".
- Execute Motion Command:** A "Command" dropdown set to "Move" and an "Execute" button.
- Teach Points:** Shows "Point File: Points.pts" and "Point: P0 - Start", with "Teach" and "Edit" buttons.

On the right side, a 3D simulation shows a white Epson robot arm positioned above a blue square base with six yellow dots. A blue arrow points downwards from the robot's end effector towards the base. A timer at the top right of the simulation area shows "00 : 00 : 00 : 000".

At the bottom left, a code editor displays the following text:

```
wait .1  
Off Glue_Gun  
Jump Desp_6 LimZ -180  
On Glue_Gun  
Wait .1  
Off Glue_Gun
```

After you teach each point it is a good practice to click the save all file icon. After all point have been taught and saved, you can check to make sure the robot can move these Points position by going to the Jog & Teach Menu and Execute a motion to each position. See next page.

The screenshot displays the EPSON RC+ 5.4.4 software interface. The main window is titled "Robot Manager" and shows a table of points. The table has columns for Number, Name, X, Y, Z, U, Local, and Hand. The points are listed as follows:

Number	Name	X	Y	Z	U	Local	Hand
0	Start	111.982	305.567	-110.564	187.500	0	Righty
1	Desp_1	111.982	305.567	-319.655	187.500	0	Righty
2	Desp_2	103.134	460.345	-319.655	187.500	0	Righty
3	Desp_3	-12.333	456.350	-319.655	187.500	0	Righty
4	Desp_4	-7.334	311.245	-319.655	187.500	0	Righty
5	Desp_5	-110.283	311.246	-319.655	187.500	0	Righty
6	Desp_6	-124.832	452.803	-319.655	187.500	0	Righty
7							
8							
9							
10							
11							
12							
13							
14							

The interface also includes a 3D model of a robot arm on the right, a control panel on the left, and a code editor at the bottom. The code editor shows the following code:

```
wait .1
Off Glue_Gun
Jump Desp_6 LimZ -180
On Glue_Gun
Wait .1
Off Glue_Gun

cycleCount = cycleCount + 1
Print "Cycle count: ", cycleCount
```

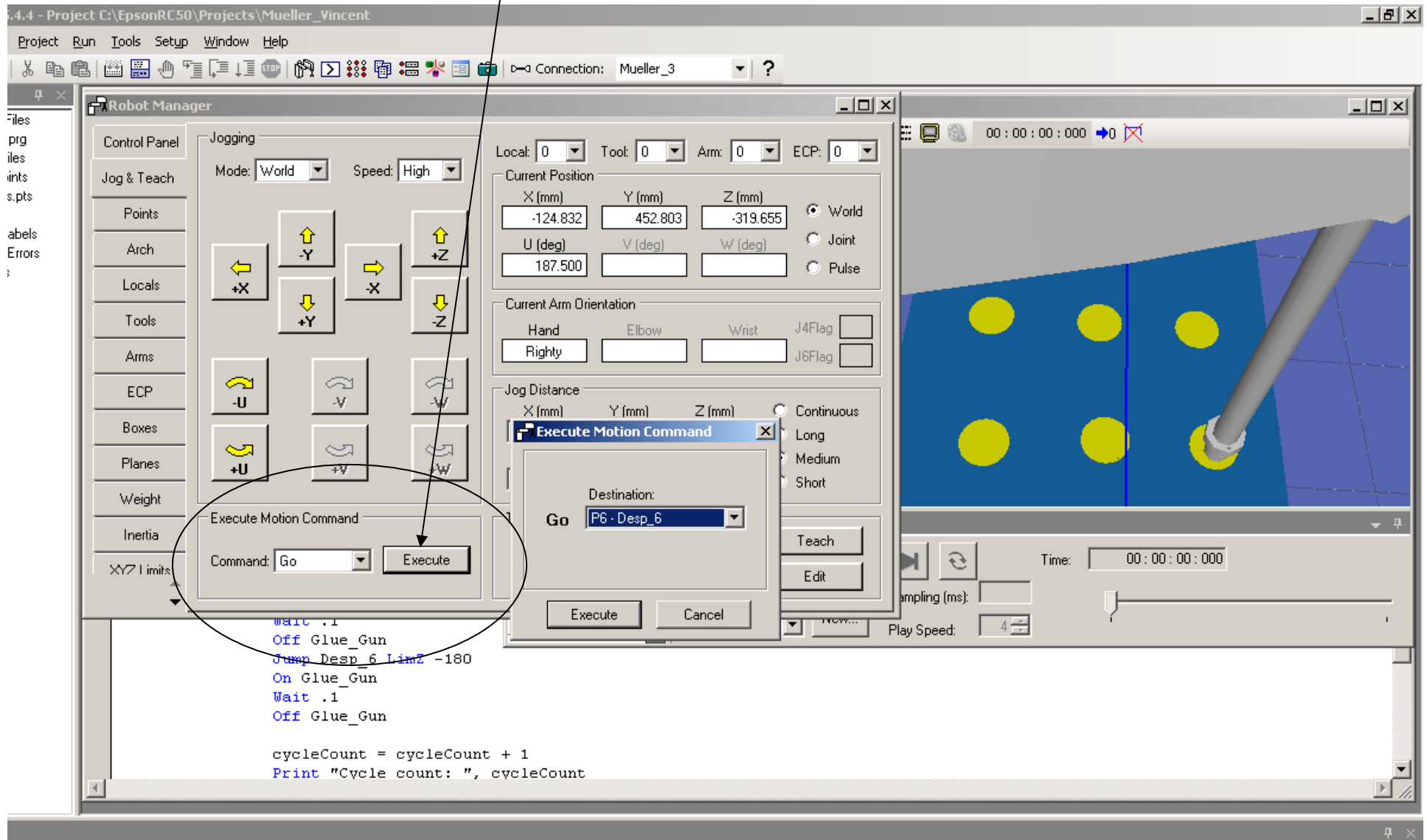
The screenshot shows the Windows taskbar at the bottom of the screen. The taskbar includes the Start button, several open applications (Google - Windows I..., 3 Lotus Notes, Microsoft Excel, QuoteWerks - [Unti..., EPSON RC+ 5.4.4 ..., Microsoft PowerPoi...), and the system tray with icons for Program, EStop, Safety, Error, Warning, Tasks Running, and a clock showing 1:42 PM. The system tray also displays a 100% CPU usage indicator and a network icon.

You can select the type of motion command from the pull down

The screenshot displays the Epson Robot Manager software interface. The main window is titled "EpsonRC50\Projects\Mueller_Vincent". The interface includes a menu bar (Tools, Setup, Window, Help), a toolbar, and a connection status indicator (Mueller_3). The "Robot Manager" window is open, showing various control panels. The "Execute Motion Command" section is highlighted, with a dropdown menu open, listing the following options: Go, Jump :Z(0), Jump, Go, Move, Arc, and Arc3. The "Go" option is currently selected. The background shows a 3D simulation of a robot arm with yellow joints and a blue base.

Control Panel
Jogging
Mode: World Speed: High
Local: 0 Tool: 0 Arm: 0 ECP: 0
Current Position
X (mm) -124.832 Y (mm) 452.803 Z (mm) -319.655
U (deg) 187.500 V (deg) W (deg)
World
Joint
Pulse
Current Arm Orientation
Hand Elbow Wrist J4Flag
Rightly
J6Flag
Jog Distance
X (mm) 1.000 Y (mm) 1.000 Z (mm) 1.000
U (deg) 1.000 V (deg) W (deg)
Continuous
Long
Medium
Short
Execute Motion Command
Command: Go Execute
Teach Points
Point File: Points.pts Teach
Point: P6 - Desp_6 Edit
Rotation
Play Speed: 4
Time: 00:00:00:000
Sampling (ms):
Wait .1
Off Glue_Gun

After you have selected the type of motion command from the pull down, click Execute. This will bring up another menu, asking you to Execute or Cancel. After you have tested each position and you are satisfied, you can then run your program. Save & Close Robot Manager.



Click on the Open run Window or Click F5 key. This will compile all file for the project and download them into your controller. See next page.

The screenshot displays the EPSON RC+ 5.4.4 software interface. The main window is divided into several sections:

- Project Explorer:** Shows a tree view of the project files, including Program Files, Main.prg, Include Files, Robot Points, Labels, I/O Labels, User Errors, and Functions.
- Code Editor:** Contains the following code:

```
Function main
Long cycleCount

InitRobot

Do

    Jump Start_Pos
    Wait Sw(PartInPos) = On
    Go Desp_1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_2 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_3 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_4 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_5 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_6 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun

    cycleCount = cycleCount + 1
    Print "Cycle count: ", cycleCount
```
- Robot Simulator:** Shows a 2D layout of a robot arm (Scara) and a pallet. The pallet is a yellow rectangle with six yellow circles representing cylinders. The robot arm is a yellow and pink structure. The simulator includes a toolbar with various icons and a status bar at the bottom.
- Property Table:** Located below the 2D layout, it shows the following properties:

Property	Value
Name	Scara
Type	Scara
Series	G20
Model	G20-A045R
Change Ro	Click to cha
Position	
X(mm)	0.000
Y(mm)	0.000
Z(mm)	1000.000
Rotation	

The Windows taskbar at the bottom of the screen shows the following elements:

- Start Button:** The Windows Start button.
- Open Applications:** Google - Windows I..., 3 Lotus Notes, Microsoft Excel, QuoteWerks - [Unti..., EPSON RC+ 5.4.4 ..., Microsoft PowerPoi..., ACT! by Sage - Sou...
- System Tray:** Includes a volume icon, a network icon, a battery icon, and a clock showing 2:03.

Note, if you have a mistake, the compiler will give you an Error message in the Status Window. You can double click the error which will take you to the line of code with the error. In this case I have a Point Name error. To correct I need to change the name in the point file or in my code to match.

The screenshot displays the EPSON RC+ 5.4.4 software interface. The main window is titled "EPSON RC+ 5.4.4 - Project C:\EpsonRC50\Projects\Mueller_Vincent". The interface is divided into several panes:

- Project Explorer:** Shows a tree view of the project files, including "Program Files", "Include Files", "Robot Points", "Labels", "I/O Labels", "User Errors", and "Functions".
- Main.prg:** Contains the following code:

```
Function main
Long cycleCount

InitRobot

Do
    Jump Start_Pos
    Wait Sw(PartInPos) = On
    Go Desp_1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_2 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_3 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_4 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_5 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_6 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
```
- Robot Manager:** A dialog box with a "Point File" dropdown set to "Points.pts". It contains a table of points with columns: Number, Name, X, Y, Z, U, Local, and Hand.
- Status:** Shows an error message: "14:08:52 ##Error: 3205, File: Main.prg, Line: 7, Point is not specified." and "14:08:52 Build aborted due to errors".

Number	Name	X	Y	Z	U	Local	Hand
0	Start	111.982	305.567	-110.564	187.500	0	Righty
1	Desp_1	111.982	305.567	-319.655	187.500	0	Righty
2	Desp_2	103.134	460.345	-319.655	187.500	0	Righty
3	Desp_3	-12.333	456.350	-319.655	187.500	0	Righty
4	Desp_4	-7.334	311.245	-319.655	187.500	0	Righty
5	Desp_5	-110.283	311.246	-319.655	187.500	0	Righty
6	Desp_6	-124.832	452.803	-319.655	187.500	0	Righty
7							
8							
9							
10							
11							
12							
13							
14							

The Windows taskbar at the bottom shows the Start button, several open applications (Google, Lotus Notes, Microsoft Excel, QuoteWerks, EPSON RC+ 5.4.4, Microsoft PowerPoint), and the system tray with a 100% volume indicator and the time 2:09 PM.

After a second compile, I have another error; I have not named my inputs or outputs. I need to go to the I/O Labor Editor to make the correction. See next page.

```
EPSON RC+ 5.4.4 - Project C:\EpsonRC50\Projects\Mueller_Vincent
File Edit View Project Run Tools Setup Window Help
Project Explorer
Main.prg
Function main
Long cycleCount
    InitRobot
    Do
        Jump Start
        Wait Sw(PartInPos) = On
        Go Desp_1
        On Glue_Gun
        Wait .1
        Off Glue_Gun
        Jump Desp_2 LimZ -180
        On Glue_Gun
        Wait .1
        Off Glue_Gun
        Jump Desp_3 LimZ -180
        On Glue_Gun
        Wait .1
        Off Glue_Gun
        Jump Desp_4 LimZ -180
        On Glue_Gun
        Wait .1
        Off Glue_Gun
        Jump Desp_5 LimZ -180
        On Glue_Gun
        Wait .1
        Off Glue_Gun
        Jump Desp_6 LimZ -180
        On Glue_Gun
        Wait .1
        Off Glue_Gun
```

Status
14:16:07 Compiling Main.prg
14:16:07 Linking...
14:16:07 ##Error: 3052, File: Main.prg, Line: 8, Variable does not exist.
14:16:07 Build aborted due to errors

Click on the I/O Labels. The I/O label editor will appear.

The screenshot shows the EPSON RC+ 5.4.4 software interface. The main window is titled "I/O Label Editor" and contains a table with the following columns: "Input Bit", "Label", and "Description". The table lists input bits from 0 to 19. The "Inputs" section is expanded, showing a tree view with "Bits", "Bytes", and "Words" sub-items. Below the table, there is a code editor with the following text:

```
Off Glue_Gun
Jump Desp_5 LimZ -180
On Glue_Gun
Wait .1
Off Glue_Gun
Jump Desp_6 LimZ -180
On Glue_Gun
Wait .1
Off Glue_Gun
```

The status bar at the bottom of the window displays the time as 2:20 PM and the system tray includes icons for Program, EStop, Safety, Error, Warning, and Tasks Running.

Under the Input Bit Label for Input 0, I entered the name “PartInPos” then click Save.

The screenshot shows a software interface with a ladder logic program on the left and an "I/O Label Editor" window on the right. The ladder logic program includes the following code:

```
ion main
cycleCount

InitRobot

Do
  Jump Start
  Wait Sw(PartInPos) = On
  Go Desp_1
  On Glue_Gun
  Wait .1
  Off Glue_Gun
  Jump Desp_2 LimZ -180
  On Glue_Gun
  Wait .1
  Off Glue_Gun
  Jump Desp_3 LimZ -180
  On Glue_Gun
  Wait .1
  Off Glue_Gun
  Jump Desp_4 LimZ -180
  On Glue_Gun
  Wait .1
  Off Glue_Gun
  Jump Desp_5 LimZ -180
  On Glue_Gun
  Wait .1
  Off Glue_Gun
  Jump Desp_6 LimZ -180
  On Glue_Gun
  Wait .1
  Off Glue_Gun
```

The "I/O Label Editor" window displays a tree view on the left and a table on the right. The tree view shows the following structure:

- Standard I/O
 - Inputs
 - Bits
 - Bytes
 - Words
 - Outputs
 - Bits
 - Bytes
 - Words
- Extended I/O
- Fieldbus I/O
- Memory

The table on the right has the following columns: Input Bit, Label, and Description. The first row is highlighted, showing Input Bit 0 with the label "PartInPos".

Input Bit	Label	Description
0	PartInPos	
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		

Under the Output Bit 0 Label, I entered the name; Glue_Gun and then click Save!

The screenshot shows a software interface with a code editor on the left and an I/O Label Editor window on the right. The code editor displays the following code:

```
Function main
Long cycleCount

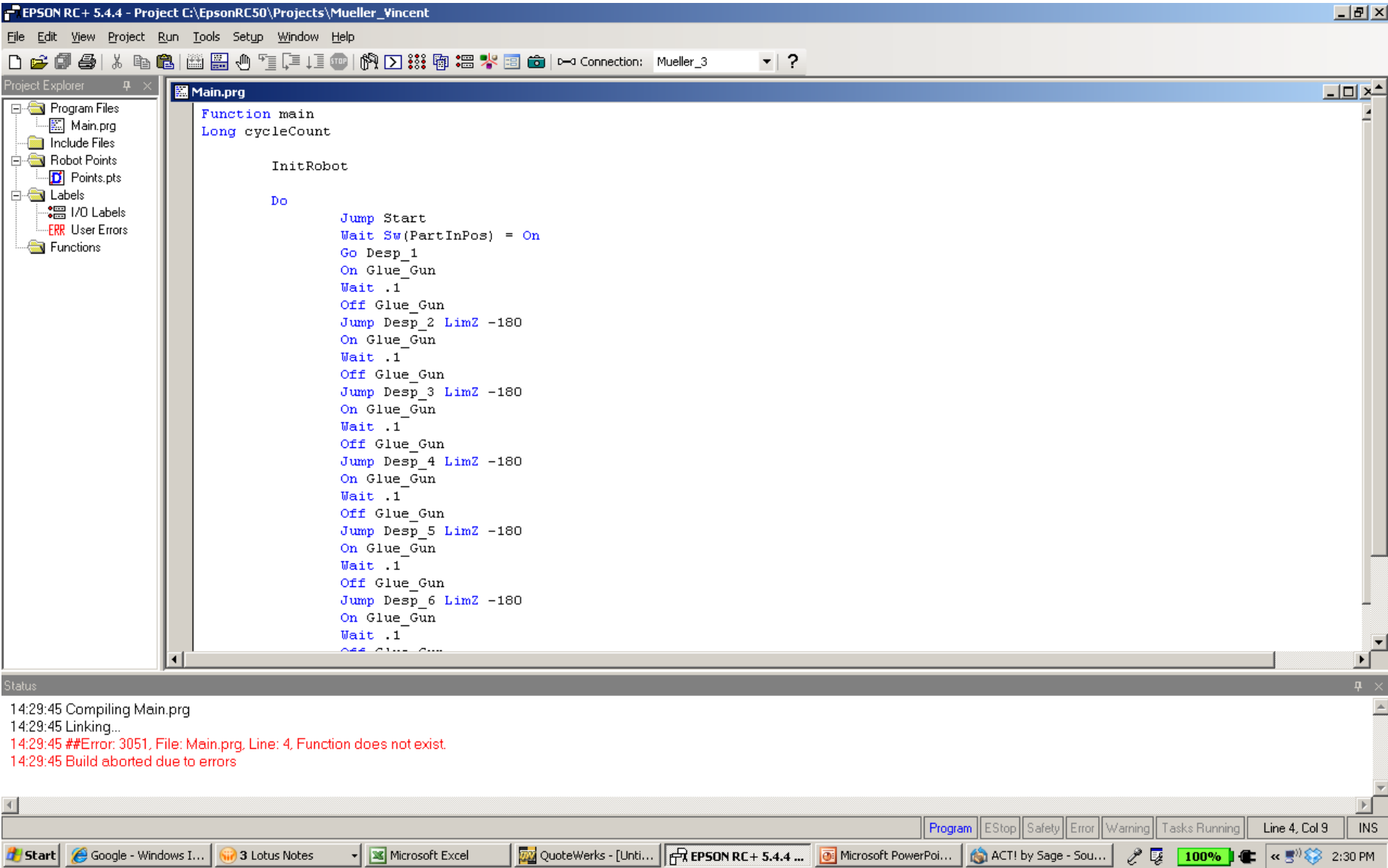
InitRobot

Do
    Jump Start
    Wait Sw(PartInPos) = On
    Go Desp 1
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_2 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_3 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_4 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_5 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
    Jump Desp_6 LimZ -180
    On Glue_Gun
    Wait .1
    Off Glue_Gun
```

The I/O Label Editor window is titled "I/O Label Editor *". It contains a tree view on the left and a table on the right. The tree view shows a hierarchy of I/O components: Standard I/O, Inputs, Outputs, Extended I/O, Fieldbus I/O, and Memory. The table on the right has three columns: Output Bit, Label, and Description. The first row is selected, showing Output Bit 0 and Label Glue_Gun.

Output Bit	Label	Description
0	Glue_Gun	
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

After the third compile, I discover that I do not have anything for “InitRobot” which is a “Call” command to execute another Function. To correct this I will add another call Function named “InitRobot” and write some code. See next page.



After I created another Function named "InitRobot" and enter my code I saved all file. Then Click on the Open run Window or Click F5 key. This will compile all file for the project and download them into your controller. See next page.

```
ct C:\EpsonRC50\Projects\Mueller_Vincent
un Tools Setup Window Help
Connection: Mueller_3
Jump Desp_3 LimZ -180
On Glue_Gun
Wait .1
Off Glue_Gun
Jump Desp_4 LimZ -180
On Glue_Gun
Wait .1
Off Glue_Gun
Jump Desp_5 LimZ -180
On Glue_Gun
Wait .1
Off Glue_Gun
Jump Desp_6 LimZ -180
On Glue_Gun
Wait .1
Off Glue_Gun

cycleCount = cycleCount + 1
Print "Cycle count: ", cycleCount

Loop

Fend

Function InitRobot
Reset
If Motor = Off Then
Motor On
Power High
Speed 50
Accel 50, 50
Else
Print "Motor On"

EndIf
Fend
```

Before Clicking Start, open the I/O Monitor & the Simulator. See next pages

Project C:\EpsonRC50\Projects\Mueller_Vincent

Run Tools Setup Window Help

Connection: Mueller_3

Main.prg

On Glue Gun

Run

Motor On

Form Function

main

Start Pause

Stop Continue

Display Video

Scale: 3/4

Camera: Any

Low Power Speed Factor: 100 %

```
Function InitRobot
  Reset
  If Motor = Off Then
    Motor On
    Power High
    Speed 50
    Accel 50, 50
  Else
    Print "Motor On"
  EndIf
```

Open the I/O Monitor

Open the Simulator

Project C:\EpsonRC50\Projects\Mueller_Vincen

Run Tools Setup Window Help

Connection: Mueller_3

Main.prg

On Glue Gun

Run

Motor On

Form Function

main

Low Power Speed Factor: 100 %

Start Pause

Stop Continue

Display Video

Scale: 3/4

Camera: Any

```
Fend
Function InitRobot
  Reset
  If Motor = Off Then
    Motor On
    Power High
    Speed 50
```

Connection: Mueller_3

00 : 00 : 00 : 000

I/O Monitor

Standard View | Custom View 1

All Inputs

Bit	Status	Label
0	<input type="radio"/>	PartInPos
1	<input type="radio"/>	
2	<input type="radio"/>	
3	<input type="radio"/>	
4	<input type="radio"/>	
5	<input type="radio"/>	
6	<input type="radio"/>	
7	<input type="radio"/>	
8	<input type="radio"/>	
9	<input type="radio"/>	

All Outputs

Bit	Status	Label
0	<input type="radio"/>	Glue_Gun
1	<input type="radio"/>	
2	<input type="radio"/>	
3	<input type="radio"/>	
4	<input type="radio"/>	
5	<input type="radio"/>	
6	<input type="radio"/>	
7	<input type="radio"/>	
8	<input type="radio"/>	
9	<input type="radio"/>	

Hexadecimal Values

Virtual I/O Mode

00 : 00 : 00 : 000

Click Start

Form Function

main

Start Pause

Stop Continue

Display Video

Scale: 3/4

Camera: Any

Speed Factor: 100 %

Low Power

Vincent.vis

Program | EStop | Safety | Emergency | Warning | Tools Panel

Double clicking the input “PatInPos” Status light will initialize the program.

The screenshot displays a CNC control software interface. At the top, the title bar reads "5.4.4 - Project C:\EpsonRC50\Projects\Mueller_Vincent". The main menu includes "Project", "Run", "Tools", "Setup", "Window", and "Help". A toolbar contains various icons, including a red "STOP" button. The connection is identified as "Mueller_3".

The "I/O Monitor" window is open, showing two columns: "All Inputs" and "All Outputs". Both columns have radio buttons for "Bits", "Bytes", and "Words", with "Bits" selected. The "All Inputs" table has a "Status" column where the "PatInPos" input (Bit 0) is active, indicated by a red light icon. The "All Outputs" table shows "Glue_Gun" (Bit 0) as an output.

The main window features a 3D model of a machine on a blue grid. A red arrow points upwards from the machine. A timer at the top right shows "00:00:14:790". At the bottom, there are controls for "Start", "Pause", "Stop", and "Continue", along with a "Speed Factor" set to 100% and a "Display Video" checkbox.

Bit	Status	Label
0	●	PatInPos
1	○	
2	○	
3	○	
4	○	
5	○	
6	○	
7	○	
8	○	

Bit	Status	Label
0	○	Glue_Gun
1	○	
2	○	
3	○	
4	○	
5	○	
6	○	
7	○	
8	○	

For more information please review manual, located under; Help, EPSON RC+5.0 User Guide

The screenshot displays the EPSON RC+ 5.0 software interface. The main window title is "ject C:\EpsonRC50\Projects\Mueller_Vincent". The "Help" menu is open, showing options: "How Do I" (Ctrl+F1), "Contents", "Index", "Search...", "Manuals", and "About EPSON RC+ 5.0...". The "Manuals" submenu is expanded, listing various manuals including "EPSON RC+ 5.0 User's Guide", "SPEL+ Language Reference", "Remote Control Manual", "RC180 Safety and Installation Manual", "RC180 Controller Manual", "RC90 Safety and Installation Manual", "RC90 Controller Manual", "Vision Guide 5.0 User Manual", "Vision Guide 5.0 Properties and Results Reference", "CV1 Safety and Installation Manual", "VB Guide 5.0 Manual", "GUI Builder 5.0 Manual", "TP1 Manual", "TP2 Manual", "OP1 Safety and Installation Manual", "OP1 Manual", "ProSix P53 Robot Manual", "ProSix P53L P53LP Robot Manual", "ProSix P55 Robot Manual", "G1 Robot Manual", "G3 Robot Manual", and "G6 Robot Manual".

The interface includes a "Run" menu, "Tools", "Setup", and "Window" menus. A "Connection" dropdown shows "Mueller_3". A "Monitor" section has "Standard View" and "Custom View 1" buttons. A "Hexadecimal Values" section shows a table with columns for Bit, Status, and Label. The "Speed Factor" is set to 100%.

The 3D simulation area shows a robot arm with a red vertical axis and a blue base with yellow dots. A timer at the bottom right shows "Time: 00:00:00:000".

Bit	Status	Label	Bit	Status	Label
0	<input checked="" type="radio"/>	PartInPos	0	<input type="radio"/>	Glue_0
1	<input type="radio"/>		1	<input type="radio"/>	
2	<input type="radio"/>		2	<input type="radio"/>	
3	<input type="radio"/>		3	<input type="radio"/>	
4	<input type="radio"/>		4	<input type="radio"/>	
5	<input type="radio"/>		5	<input type="radio"/>	
6	<input type="radio"/>		6	<input type="radio"/>	
7	<input type="radio"/>		7	<input type="radio"/>	
8	<input type="radio"/>		8	<input type="radio"/>	
9	<input type="radio"/>		9	<input type="radio"/>	

Under Simulator

8. Simulator

8.1 Simulator Functions

Simulator functions enable easy robot motion checking on your PC, which gives you flexibility to consider the system layout, measure the operation time, and create robot programs.

They are useful from the introduction stage to the launch of robot system.

The Simulator is supported in EPSON RC+ 5.0 Ver.5.4 or later.

8.1.1 Overview

The following are the major simulator functions:

Robot motion 3D display

- Shows robot orientation and motion in a 3D display from various viewpoints.
- Offers accurate display data based on design data.

Interference check

- Checks whether the robot (including the hand) interferes with itself or its peripherals.

Robot operation time prediction

- Predicts the robot operation time for a program.
- Considers the speed setting (Speed, etc.) and acceleration / deceleration setting (Accel, etc.) when predicting the robot motion time.

SPEL+ program execution

- Allows you to create, execute, and debug SPEL+ programs.

The restrictions on the simulator functions are described in 8.4 Specification and