
PanelMate® PC DDE Connectivity Communication Driver Manual

Preface

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e-TRC

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Introduction

This manual tells how to use your PanelMate PC operator station to retrieve and receive information from other Microsoft Windows programs via a DDE (Dynamic Data Exchange) conversation.

A DDE conversation is based on a messaging system built into Microsoft Windows. Two Windows applications can carry on a DDE conversation by posting messages to each other. The two applications are known as the DDE Server and the DDE Client. A DDE Server is an application that supplies data to other Windows applications. A DDE Client is an application that obtains data from the DDE Server application.

Installing Drivers

PanelMate Configuration Editor software is installed using a CD-ROM. To install the drivers from the CD-ROM, select the **Install Software** option and then **Install Drivers**. From the dialog box, select the driver you wish to install.

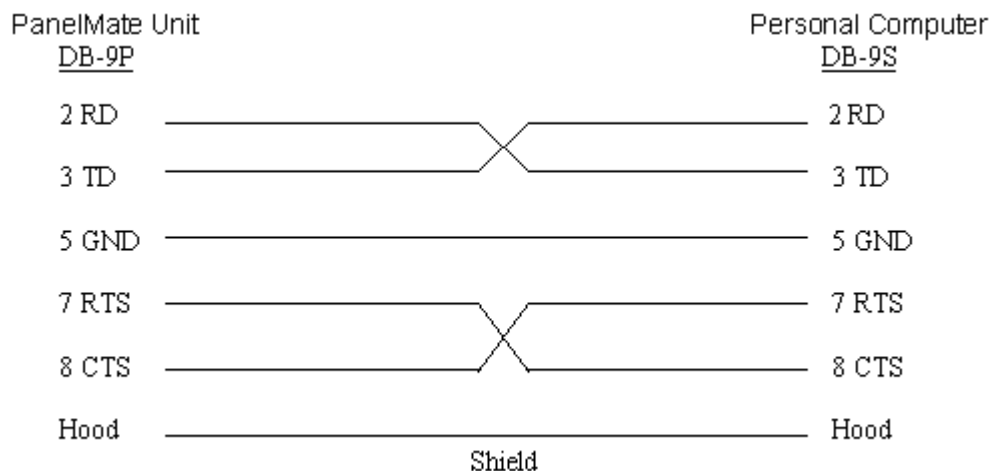
Downloading Drivers to a PanelMate Unit

- In the VCP Transfer Utility, choose the “Executive” tab and select the proper Executive Firmware to download to the PanelMate unit.
- Click the button labeled “Add to Operation List.”

Note: In order to download to a PanelMate for the first time or to clear the existence of another driver, the PanelMate must first be loaded with Executive Firmware.
- Choose the “Driver” tab.
- Select the appropriate driver to be downloaded to the PanelMate.
- Click the button labeled “Add to Operation List.”
- Place the PanelMate unit in Serial Transfer Mode.
- Connect a serial transfer cable from the correct port on the PC to port 1 on the PanelMate. (See cabling below.)
- Click “Start” at the bottom of the VCP Transfer Utility window.
- **Note:** For a more detailed description of downloading procedures and troubleshooting see *PanelMate Power Series, PowerPro, Pro LT Transfer Utility User’s Guide*.

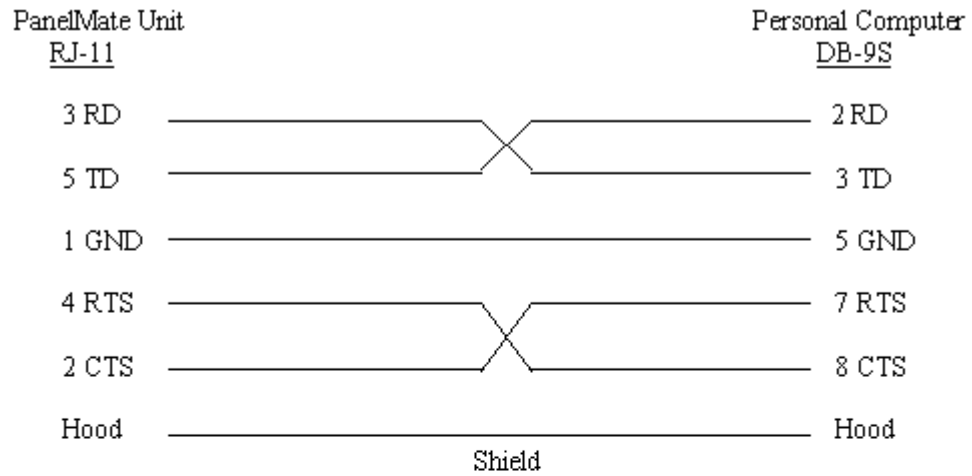
Serial Transfer Cables

Cable P/N 0518

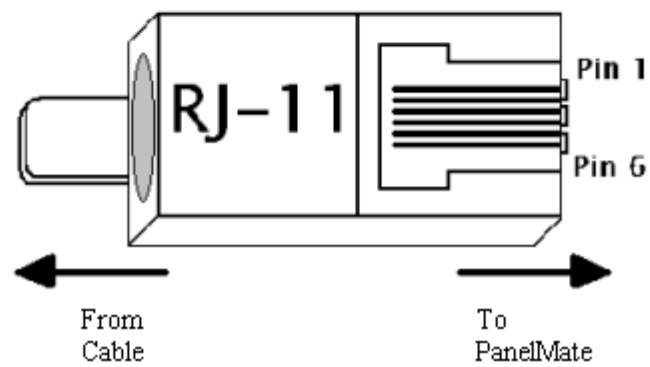


Cable P/N 0818

(PanelMate Power Series 1500 and PanelMate 500 only)



RJ-11 pin configuration



PanelMate PC as a Server

The PanelMate PC operator station may be used as a DDE Server (i.e., supply data to another Windows program.) Examples of other applications that may be used as DDE Clients to the PanelMate PC DDE Server are listed below.

- A Microsoft Access database application which extracts PLC or controller data from the PanelMate PC operator station and acts as an SQL Server to a host computer over an Ethernet network.
- A Microsoft Visual Basic application that displays pop-up windows that appear on top of PanelMate PC screens.
- A Microsoft Visual Basic application or Microsoft Excel spreadsheet which configures a recipe or machine setup by writing to PanelMate PC's DDE Server.
- A Microsoft Access database or Microsoft Excel spreadsheet that provides reports using data from a PanelMate configuration.

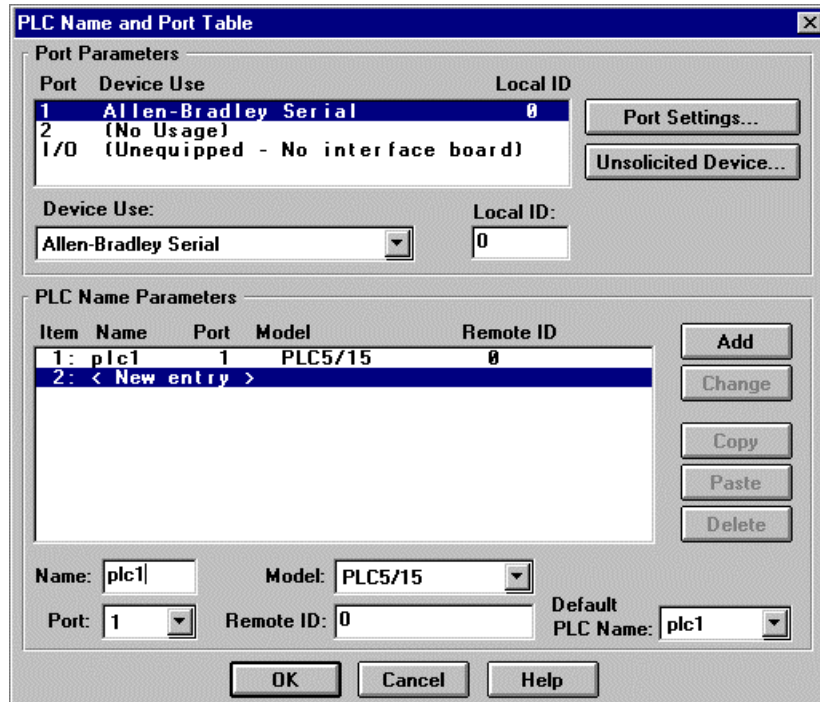
To use the PanelMate PC operator station as a DDE Server, there are five steps that need to be completed.

- Open the PanelMate Configuration Editor and configure the PLC or controller in the PLC Name and Port Table.
- Develop the PanelMate PC configuration.
- Export the PanelMate PC configuration.
- Double-click on the .PPS file to run the PanelMate PC configuration.
- Open the DDE Client application and enter the DDE information at the appropriate location, or if the DDE information has already been configured, simply open the DDE Client application.

The following example will describe how to configure the PanelMate PC operator station as a DDE Server and use a Microsoft Excel spreadsheet as the DDE Client. A PanelMate PC configuration will be created with three Readout Templates displaying three PLC register values. The PLC register values will be supplied to a Microsoft Excel spreadsheet that will also display an associated bar graph.

1. Open the PanelMate Configuration Editor and configure the PLC Name and Port Table.

Configure the PLC Name and Port Table with the appropriate PLC or controller. The Allen-Bradley Serial driver is selected in the figure below.



The dialog box is titled "PLC Name and Port Table". It contains two main sections: "Port Parameters" and "PLC Name Parameters".

Port Parameters:

Port	Device Use	Local ID
1	Allen-Bradley Serial	0
2	(No Usage)	
I/O	(Unequipped - No interface board)	

Buttons: Port Settings..., Unsolicited Device...

Device Use: Allen-Bradley Serial (dropdown)
Local ID: 0 (text field)

PLC Name Parameters:

Item	Name	Port	Model	Remote ID
1	plc1	1	PLC5/15	0
2	< New entry >			

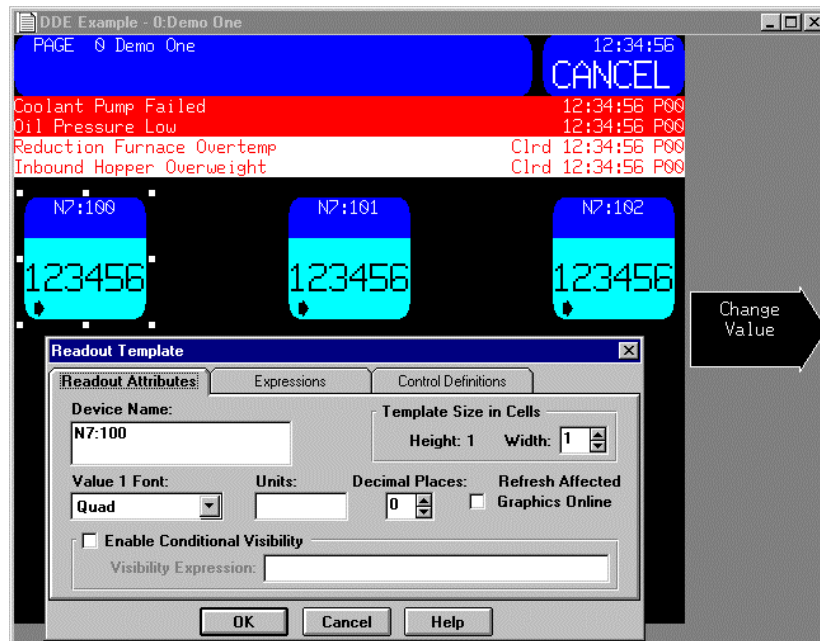
Buttons: Add, Change, Copy, Paste, Delete

Name: plc1 (text field)
Model: PLC5/15 (dropdown)
Port: 1 (dropdown)
Remote ID: 0 (text field)
Default PLC Name: plc1 (dropdown)

Buttons: OK, Cancel, Help

2. Develop the PanelMate PC configuration.

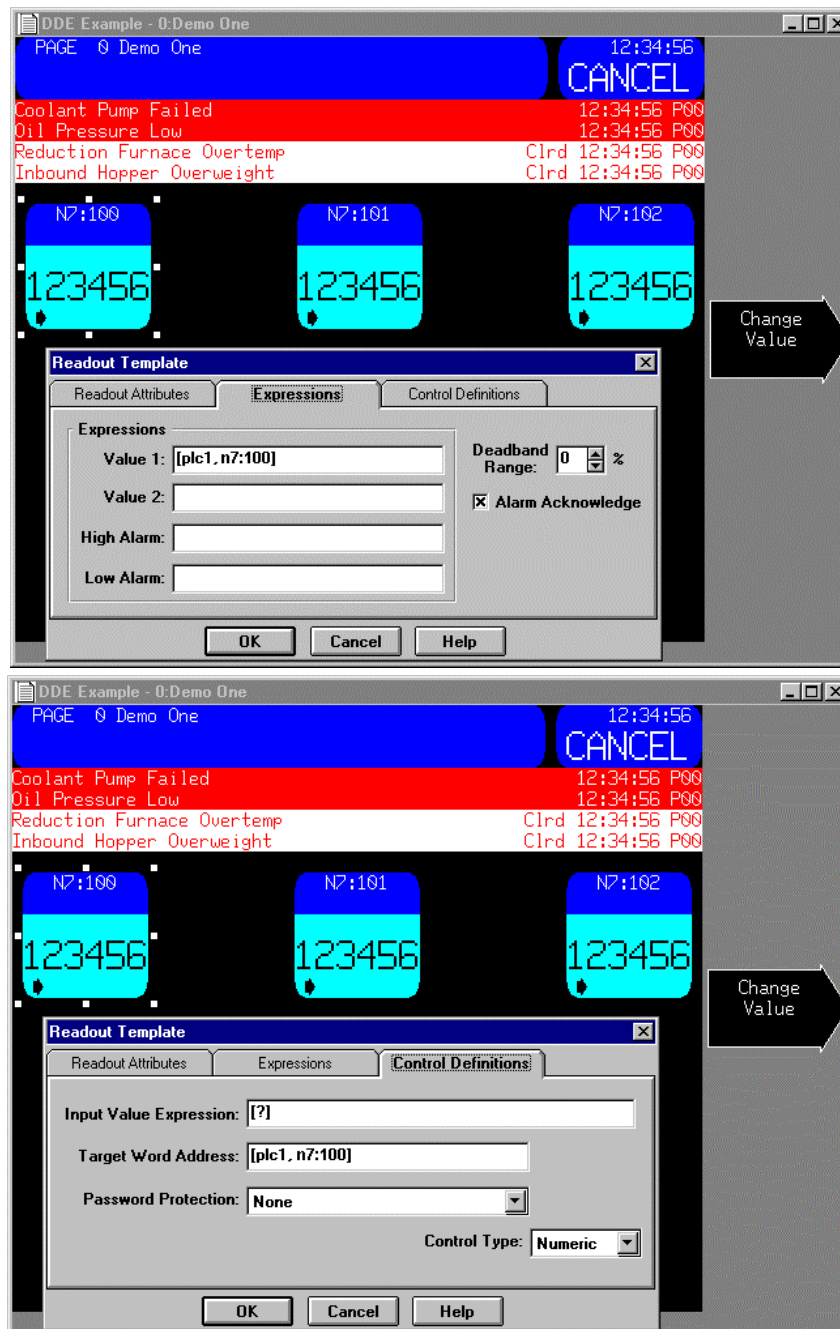
The configuration used in this example consists of three Readout Templates on a page. The following figures show how each tab in the Readout Template dialog box is configured. Each Readout Template is configured for a different PLC register.



The screenshot shows a PanelMate PC configuration window titled "DDE Example - 0: Demo One". It displays a status page with three readout templates. The first template shows "Coolant Pump Failed" with a red background. The second template shows "Oil Pressure Low" with a red background. The third template shows "Reduction Furnace Overtemp" with a red background. The fourth template shows "Inbound Hopper Overweight" with a red background. The readout templates are labeled N7:100, N7:101, and N7:102. The readout values are 123456. A "Change Value" button is visible on the right.

The "Readout Template" dialog box is open, showing the "Readout Attributes" tab. The "Device Name" is N7:100. The "Template Size in Cells" is Height: 1, Width: 1. The "Value 1 Font" is Quad. The "Units" is empty. The "Decimal Places" is 0. The "Refresh Affected Graphics Online" checkbox is checked. The "Enable Conditional Visibility" checkbox is unchecked. The "Visibility Expression" is empty.

Buttons: OK, Cancel, Help

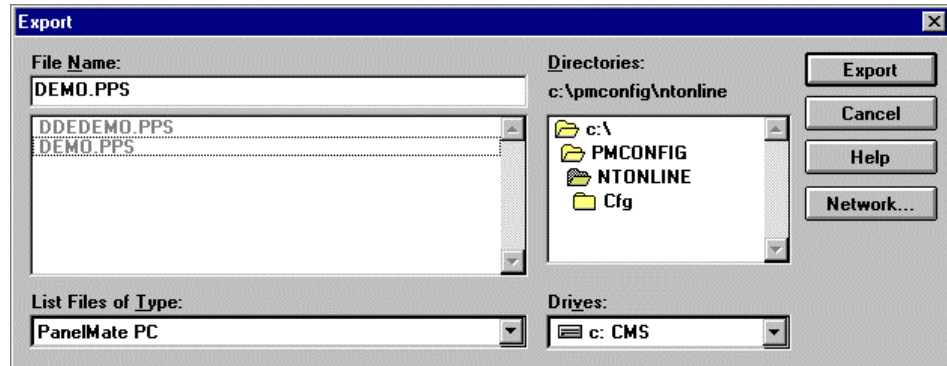


Note that when the Runtime Software is executed, each Readout Template will display the value read from the defined PLC register. The value will then be sent to the Microsoft Excel spreadsheet once the correct expressions are entered in the spreadsheet cells.

3. Export the configuration.

When you have completed your configuration, the configuration must be exported before you can execute the configuration in the Runtime Software. To export a configuration, select the configuration name in the Database Treeview Window and choose the Export selection from the File Menu.

The exported configuration will be named DEMO.PPS in the figure below.



4. Double-click on the .PPS file to run the PanelMate PC configuration.

Once you have exported the configuration, you are ready to run the PanelMate PC configuration. You may locate the file and double-click on the configuration filename or you may create a shortcut. It is much simpler to run your PanelMate PC configuration if you create a shortcut. To create a shortcut within Microsoft Windows Explorer:

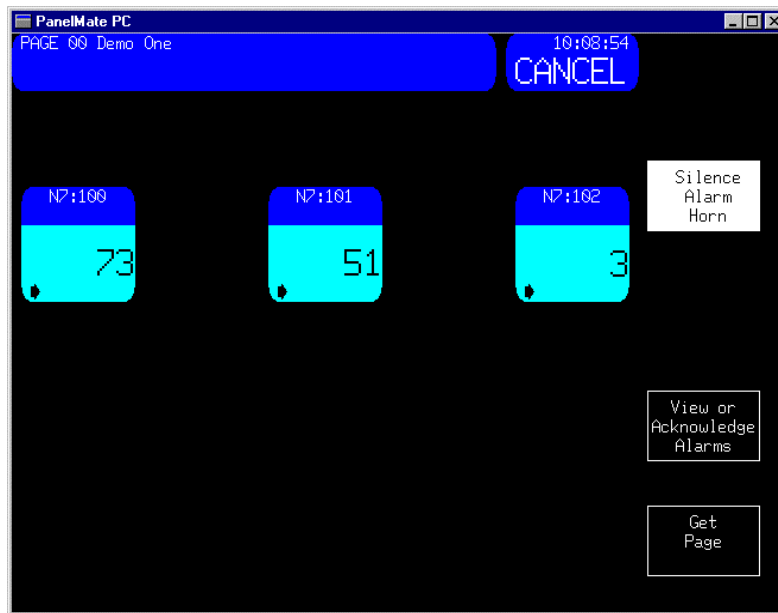
- Right click on the .PPS filename and choose the Create Shortcut selection. Once the shortcut is created, place it on the Windows desktop.
- To run a PMPC configuration in unprotected mode, do the following
 - Right click on the new icon and choose the Properties selection.
 - In the Shortcut Properties dialog box, choose the Shortcut Tab.
 - In the Target field, enter the PMC.EXE pathname, the .PPS configuration filename, and the unsecure mode parameter for the Runtime Software. Note that the unsecure mode parameter is entered to allow you to view both the DDE Server and the DDE Client applications.

For an example of an entry in the Target field, refer to the line below.

```
c:\pmconfig\ntonline\pmc.exe demo.pps -u
```

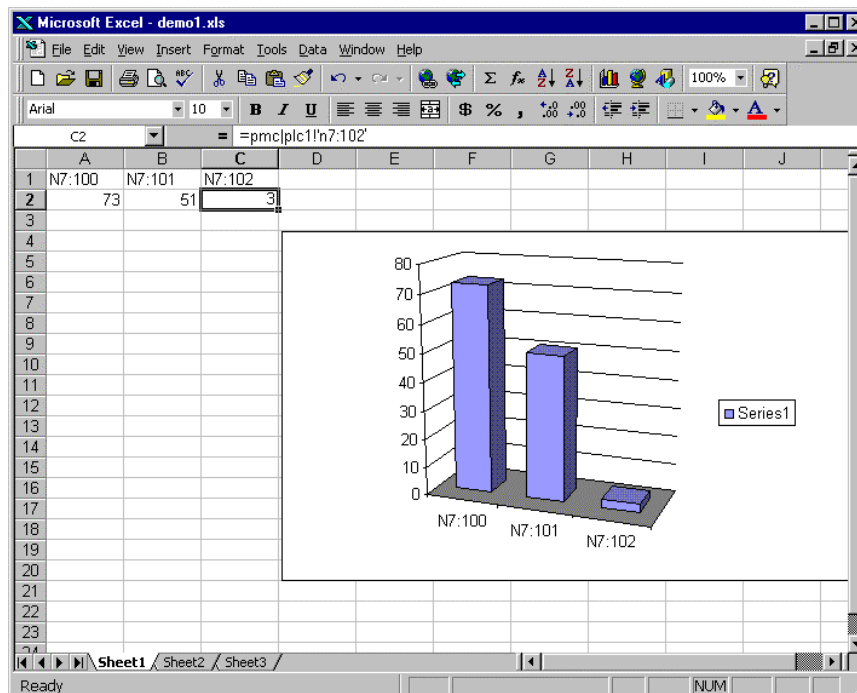
For more information on running PanelMate PC applications, refer to the PanelMate PC Runtime Operation User's Guide.

The following figure displays how the PanelMate PC configuration may appear.



5. Open the DDE Client application and enter the DDE information at the appropriate location, or if the DDE information has already been configured, simply open the DDE Client application.

In this example, Microsoft Excel will be the DDE Client. Three cells have been defined to display the PLC values for registers N7:100, N7:101, and N7:102. (These registers correspond to the three Readout Templates configured in the PanelMate Configuration Software.) In the formula bar, you must enter the DDE information so that the Microsoft Excel application can specify to the PanelMate software the type of data it wants to receive. An associated bar graph is also displayed by choosing the Chart selection from the Insert Menu.



The data entered in the formula bar is explained below.

=pmc|plc1!'n7:102'

PMC

PMC is the application name of the PanelMate PC Runtime Software. Note that when the PanelMate PC operator station is the DDE Server, the application name will always be PMC.

|

Pipe character.

Plc1

Plc1 is the topic name and is defined in the PLC Name and Port Table in the PanelMate Configuration Software. The topic name can be any name configured in the PLC Name and Port Table dialog box or Unsolicited Device dialog box. Note that the topic name will be SP when referencing scratchpad data.

!

Exclamation point.

'n7:102'

N7:102 is the PLC reference being read and displayed in Microsoft Excel. Quotation marks should always be used to display the data item.

Note that if the data item is an Allen-Bradley PLC reference, discrete information is stored in a word format in the PanelMate database. A DDE Client must use the same word format to access the data. The PanelMate PC operator station allows you to reference Allen-Bradley bits in various ways. For example, [B3/20] can also be referenced as [B3:1/4]. The PanelMate database interprets both registers as [B3:1]. The PanelMate PC runtime software interprets the /20 or the /4 to find the specific bit reference. A DDE Client must reference the address [B3:1] and perform the bit search within the DDE Client application. This issue will occur with all Allen-Bradley Binary (B), Input (I), and Output (O) file types.

Once the DDE Client application is configured, it may be saved, then closed, and re-opened anytime, as long as the same PanelMate PC configuration is running.

DDE Client Application Considerations

When using a PanelMate PC operator station as a DDE Server, it is important to understand the four separate scans that occur within the PanelMate PC operator station during Run Mode in order to provide appropriate data for the DDE Client application. The four separate scans are Screen Scan, Alarm Scan, Message Scan, and Trend Scan. The scans are described below.

- The Screen Scan scans only for the references on the currently displayed page to provide current status.
- The Alarm Scan scans for all alarm and System Parameter references, regardless of which page is currently being scanned.
- The Message Scan scans for references in the Message Library and global messages.
- The Trend Scan sets the time delay between scans from the PLC or controller of all registers references defined in all trend templates while in Run Mode.

You may define the scan delay times in the **System Parameters – Communications Tab** dialog box. By defining scan delays, it allows you to determine when the data will be updated. (This is a useful tool for controlling network and application performance in all applications.) Note that if you have a PanelMate PC configuration that does not have alarms, messages, or trends configured, the DDE Client application will only receive data updates from the page currently displayed on the PanelMate PC operator station. This is because the Screen Scan only scans the page currently displayed. Note that the DDE Client application can acquire data that is not on a currently displayed page, but the PanelMate PC operator station is not reading the data so its value may not reflect the current value in the PLC or controller.

For example, let's assume a PanelMate PC configuration contains a Readout Template with an N7:100 reference on page 0, a Readout Template with an N7:101 reference on page 1, a Readout Template with an N7:102 reference on page 3, and no alarms, messages, or trends have been configured. Let's also assume that Microsoft Excel needs to produce a report displaying the values of all three PLC registers. If page 0 is the only page being displayed, N7:100 will be the only register value that will be updated in the Microsoft Excel spreadsheet.

To resolve this issue, refer to the list of solutions below.

- On a page not being used, you may define one Line Trend Template to represent the three PLC registers or three Bar Trend Templates may be defined to represent each PLC register. The Trend Scan will scan all of the registers so that the register values will be updated in the Microsoft Excel spreadsheet regardless of the page being displayed on the PanelMate PC operator station.
- You may define the High Alarm field in the **Readout Template – Expressions Tab** dialog box for each Readout Template on each page to either a valid alarm limit or a value that will never be exceeded if alarming is not required. The Alarm Scan will scan the PLC registers for alarm conditions and update the register values in the Microsoft Excel spreadsheet regardless of the page being displayed on the PanelMate PC operator station.
- On a page not being used, you may enter the PLC registers as references in three Variable-Sized Display Templates. The Variable-Sized Display Templates must be defined as global messages on the **Variable-Sized Display Template – Expressions Tab** dialog box. The Message Scan will scan for all global messages and update the register values in the Microsoft Excel spreadsheet regardless of the page being displayed in the PanelMate PC operator station.
- You may place invisible templates on all pages with all the PLC register references that need to be updated and sent to the DDE Client. The Screen Scan will scan all PLC registers and update the register values in the Microsoft Excel spreadsheet while that page is being displayed in the PanelMate PC operator station. Note that this is the least memory efficient approach.

It is also important to note that when the PanelMate PC operator station is a DDE Server, you may write values into PLC or controller variables from the DDE Client application through the PanelMate PC operator station. When this occurs, the PanelMate PC operator station will send the data directly to the PLC or controller and not to the local PanelMate database. (The PanelMate database will be updated with the value written to the PLC or controller when the PanelMate PC operator station reads the value from the PLC or controller during the next scan.) The exception to this rule occurs when you write values to scratchpad registers from the DDE Client application through the PanelMate PC operator station. When this occurs, the PanelMate PC operator station will send the data directly to the PanelMate database.

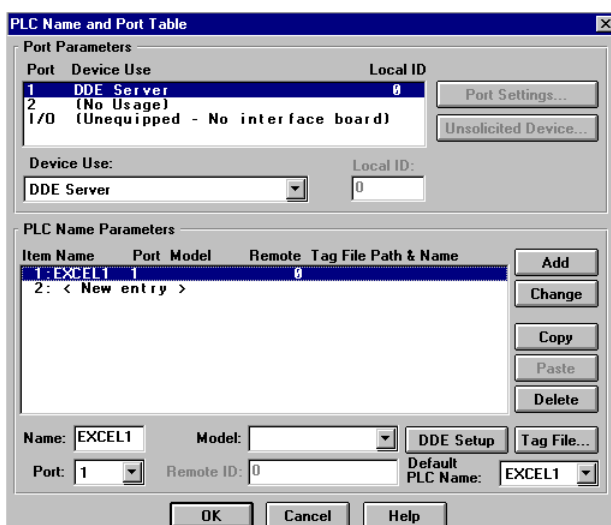
PanelMate PC as a Client

The PanelMate PC operator station may be used as a DDE Client (i.e., obtain data from another Windows program.) Examples of other applications that may be used as DDE Servers to the PanelMate PC operator station are listed below.

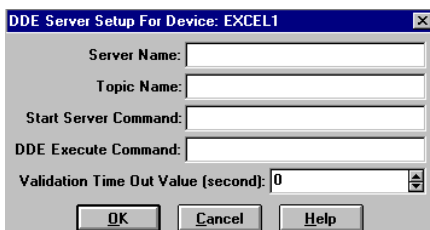
- A weigh scale feeder system that has a serial communication interface program running on the personal computer and with DDE Server capability.
- An SPC package that performs statistical calculations on data read from the PLC by the PanelMate PC operator station (PanelMate PC acting as a DDE Server) and provides results to the PanelMate operator station for display (PanelMate PC acting as a DDE Client).

The following example outlines how to configure a PanelMate PC Pro operator station as a DDE Client.

1. Open the **PLC Name and Port Table**. In the **Device Use** field, select **DDE Server**.



2. In the **Name** field, enter the logical device's name. In this example, the name is EXCEL 1.
3. Click on the Add button. The device's name will appear in the PLC Name **Parameters** window.
4. Select the connection in the **PLC Name Parameters** window. The **DDE Setup** button will appear. Click on the button to open the **DDE Server Setup for Device** dialog box.



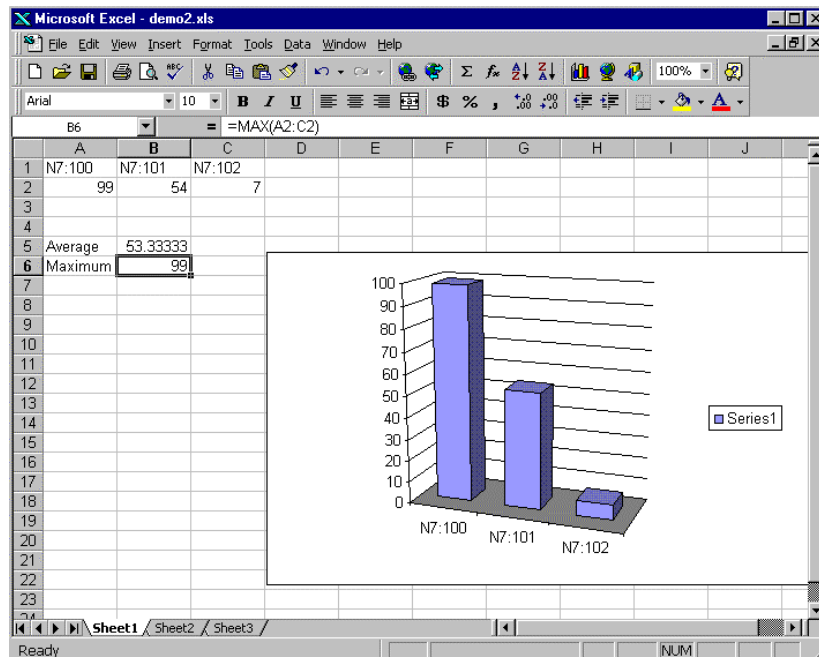
5. In the Server Name field, enter the name of the program (e.g.Excel). Each DDE server has only one server name.
6. Topic Name field: All DDE servers support at least one topic.

7. Start Server Command field: This command is the pathname of the DDE server application if it is not already running. This field may be a blank line, which means that an attempt is not made to start the DDE server application if it is not already running. It is important to note that a line full of white spaces does not constitute a blank line. The white spaces will be sent to the DDE server application to be started, which will result in an error.
8. DDE Execute field: This command is sent to the DDE server after a conversation has been initiated with the DDE server. This conversation only occurs one time at PanelMate PC startup. This field may be a blank line, which means that a DDE execute command is not sent to the DDE server. It is important to note that a line full of white spaces does not constitute a blank line. The white spaces will be sent to the DDE server application to be started, which will result in an error.
9. In the Validation Time Out Value field, enter a value between 0 and 60 seconds. A zero value indicates that no connection validation will be done. Other values determine how often the PanelMate PC Pro operator station will check to make sure the DDE server is still running if data updates have not been sent within the time window.

The following example will describe how to configure a Microsoft Excel application as a DDE Server and use the PanelMate PC operator station as the DDE Client. Average and Maximum calculations will be performed in the Microsoft Excel spreadsheet for the three PLC registers used for the Readout Templates that were shown in the previous example. The Average and Maximum calculation results will be supplied to the PanelMate software and displayed into two Bar Templates.

1. Open the Windows Server application and establish the location or address where data will be requested by the PanelMate PC software.

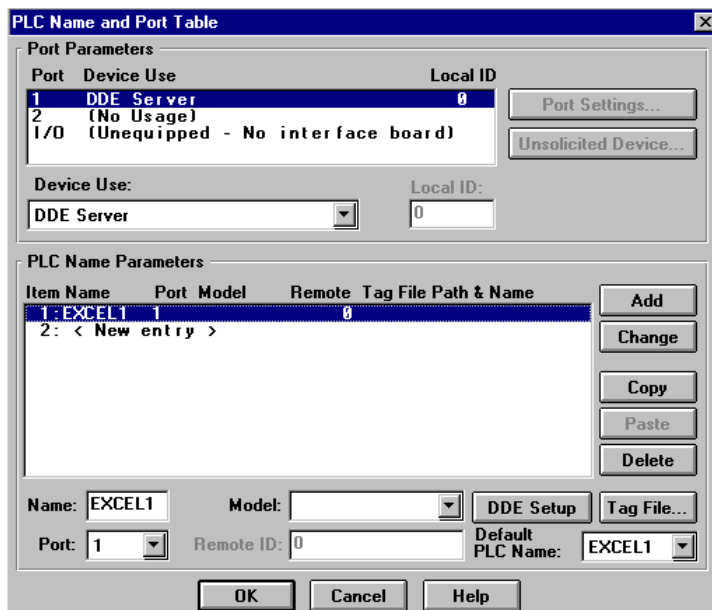
In this example, Microsoft Excel will be used as the DDE Server. Two cells have been selected to display the Average and Maximum values in the figure below. (These functions can be entered by choosing the Functions selection in the Insert Menu. Refer to the Microsoft Excel help file for more information about inserting functions.)



After the functions have been entered, close the Microsoft Excel application.

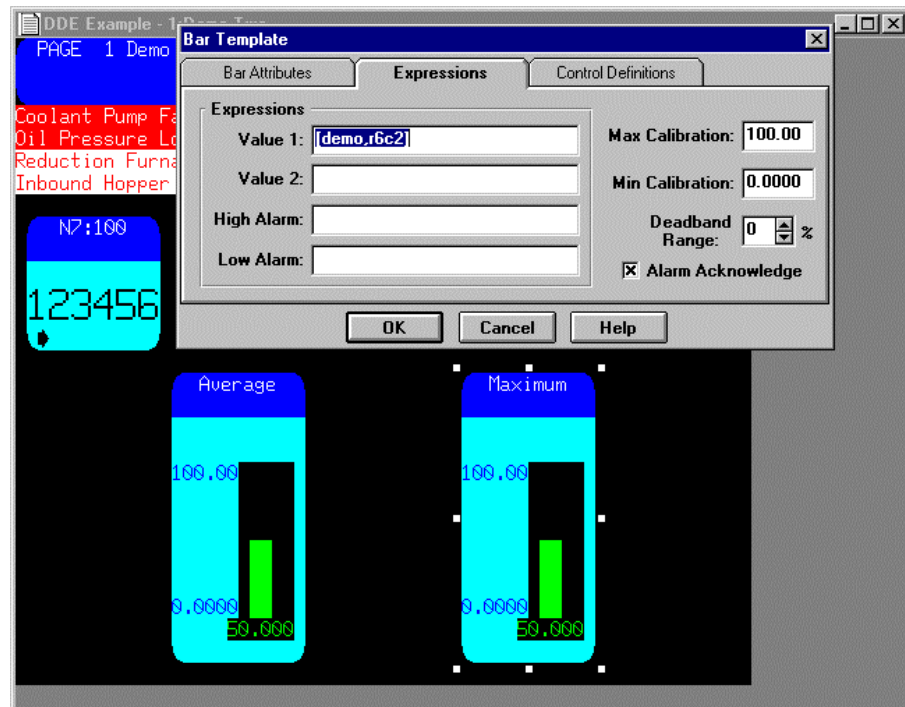
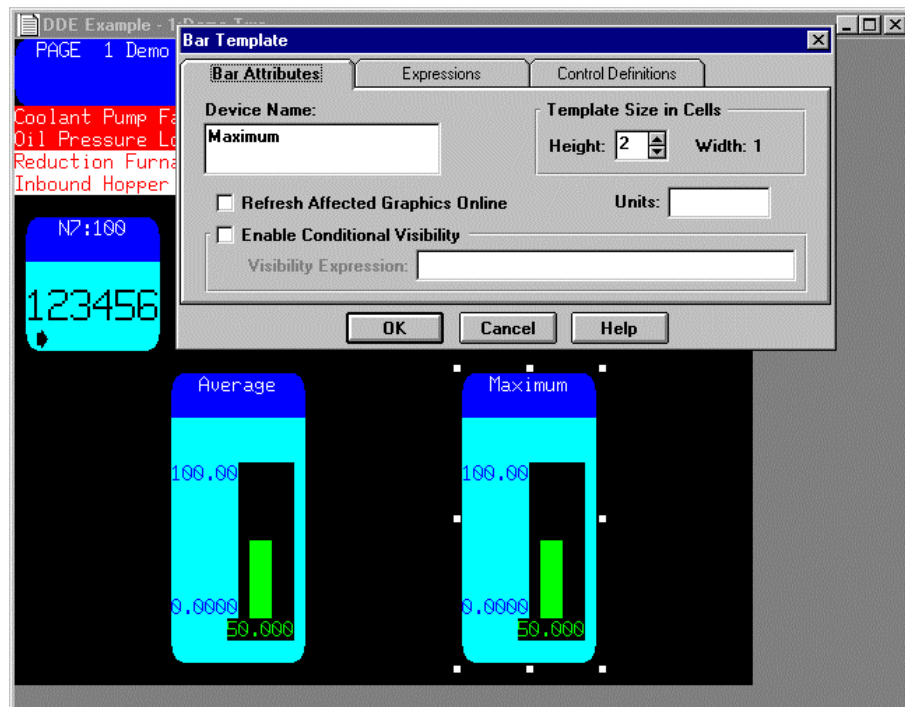
- Open the PanelMate Configuration Editor and configure the DDE Server in the PLC Name and Port Table.

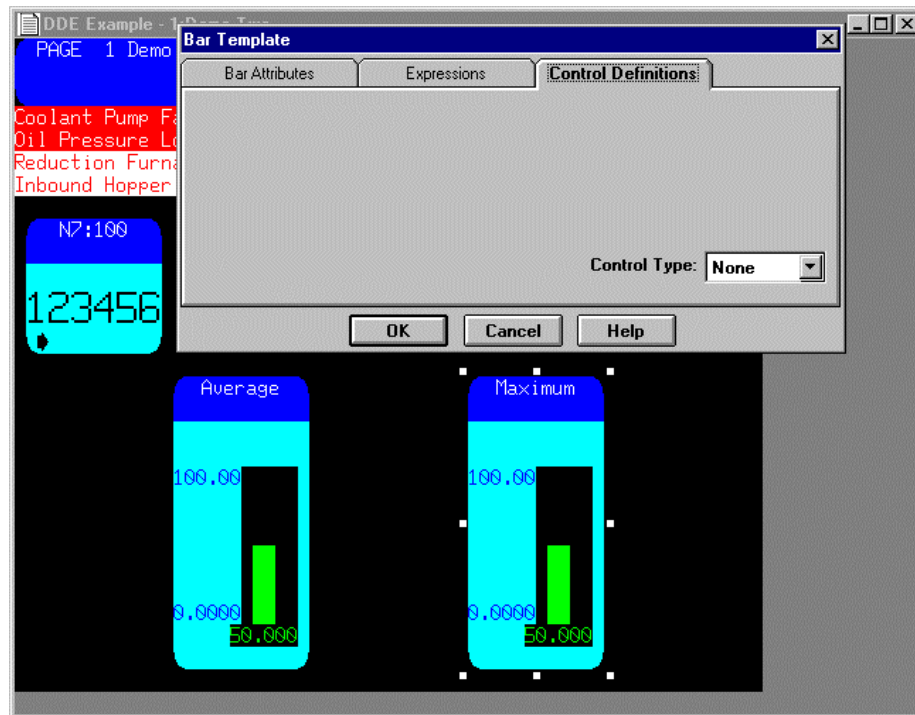
Configure the DDE Server in the PLC Name and Port Table. The DDE Server can be configured on any port that is not being used.



- Develop the PanelMate PC configuration and use references specific to the DDE Server application.

The configuration used in this example consists of three Readout Templates (defined in the previous example) and two Bar Templates. One Bar Template will be configured to display the Average calculation results while the other Bar Template will display the Maximum calculation results from the Microsoft Excel spreadsheet. The following figures show how each tab in the Bar Template dialog box is configured.





When the Runtime Software is executed, the Average Bar Template will obtain data from the r5,c2 cell, while the Maximum Bar Template will obtain data from the r6,c2 cell in the Microsoft Excel spreadsheet.

Note: Although the cells are referenced as B5 and B6 on the Microsoft Excel spreadsheet, the Microsoft Excel DDE Server refers to the cells by row and column number. This means that B5 is row 5, column 2 and is referenced as r5c2 and B6 is row 6, column 2 and is referenced as r6c2.

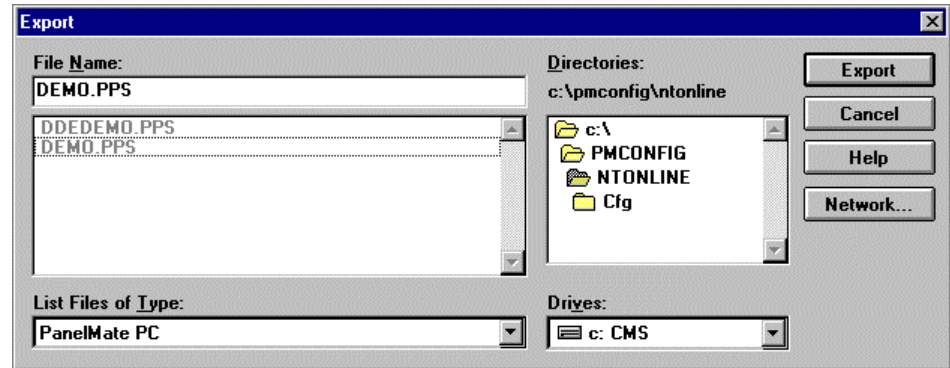
It is important to note the following items when creating a configuration to obtain data from a DDE Server application:

- The PanelMate PC operator station can write to the DDE Server through various write expression fields (e.g., System Parameters Page Change Register To field, PLC Bit Reference field, Target Word Address field, etc.)
- When the PanelMate PC operator station links to a DDE Server data item, the data will be supplied to the PanelMate PC operator station when the value is initially requested (cold link), and thereafter, whenever the value changes (hot link). The data is not scanned by the PanelMate PC operator station.

4. Export the configuration.

When you have completed your configuration, the configuration must be exported before you can execute the configuration in the Runtime Software. To export a configuration, select the configuration name in the Database Treeview Window and choose the Export selection from the File Menu.

The exported configuration will be named DEMO.PPS in the figure below.

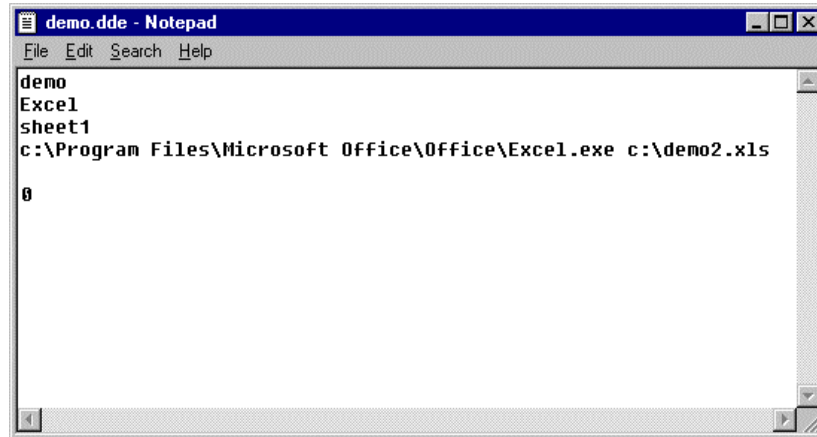


It is important to note the following configuration file issues:

- The exported configuration file (.PPS file) must have the same base name as the ASCII text file (.DDE file) which defines all DDE Servers for the PanelMate application. (Refer to step 5.)
- The configuration file (.PPS file) must be located in the same directory as the .DDE file used by the Runtime Software. (In this example, the files are located in the C:\PMCONFIG\NTONLINE directory.)

5. Create an ASCII text file to specify the DDE Server application and topic data for the PanelMate software.

At this step, an ASCII text file must be created so that the DDE Client (PanelMate software) can find and startup the DDE Server(s). The text file can be created in any text editor application. In this example, Notepad was used to create the DEMO.DDE text file.



The text file consists of the following information:

Logical Device Name	This name will correspond to the name entered in the Name field in the PLC Name and Port Table.
DDE Application Name	Each DDE Server has only one application name, the name of the program (e.g., Microsoft Excel).
DDE Topic	All DDE Servers support at least one topic.
Server Startup Command	This command is the pathname of the DDE Server executable. PanelMate PC uses this command to start the DDE Server application if it is not already running. This field may be a blank line which means that an attempt is not made to start the DDE Server application if it is not already running. It is important to note that a line full of white spaces does not constitute a blank line. The white spaces will be sent to the DDE Server application to be started which will result in an error.
DDE Execute Command	This command is sent to the DDE Server after a conversation has been initiated with the DDE Server. This conversation only occurs 1 time at PanelMate PC startup. This field may be a blank line which means that a DDE Execute command is not sent to the DDE Server. It is important to note that a line full of white spaces does not constitute a blank line. The white spaces will be sent to the DDE Server application to be started which will result in an error.
DDE Server Connection Validation Interval	This range will be 0-60 seconds. A 0 (zero) value will indicate that no connection validation will be done. If non-zero, the value determines how often the PanelMate PC operator station will check to make sure the DDE Server is still running if data updates have not been sent in this period.

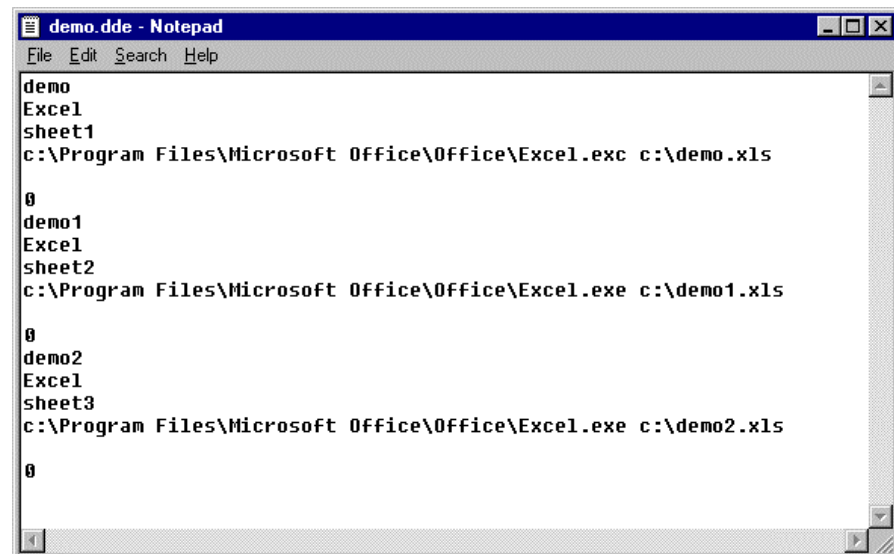
In this example, the DDE Execute Command line is blank. If a macro were created in another Windows application to print the Microsoft Excel spreadsheet once an hour, the DDE Execute Command line may appear in the ASCII text file as shown below.

```
[ RUN( "demo2.xls!Macro1" ) ]
```

It is important to note the following text file issues:

- The ASCII text file (.DDE file) must have the same base name as the configuration file (.PPS file) created in the Configuration Software.
- The ASCII text file must have a .DDE file extension.
- The ASCII text file (.DDE file) must be located in the same directory as the configuration file (.PPS file) used by the Runtime Software. (In this example, the files are located in the C:\PMCONFIG\NTONLINE directory.)
- If multiple DDE Servers are created in the PLC Name and Port Table, then multiple sets of the six definition fields must be placed in the same ASCII text file in a consecutive order with no extra blank lines.
- The last line in the ASCII text file must be followed by a carriage return.

The figure below shows a .DDE file with multiple DDE Servers.



6. Double-click on the .PPS file to run the PanelMate PC application.

Once you have completed the .DDE file, you are ready to run the PanelMate PC configuration. You may locate the file and double-click on the configuration filename or you may create a shortcut. It is much simpler to run your PanelMate PC configuration if you create a shortcut. To create a shortcut within Microsoft Explorer:

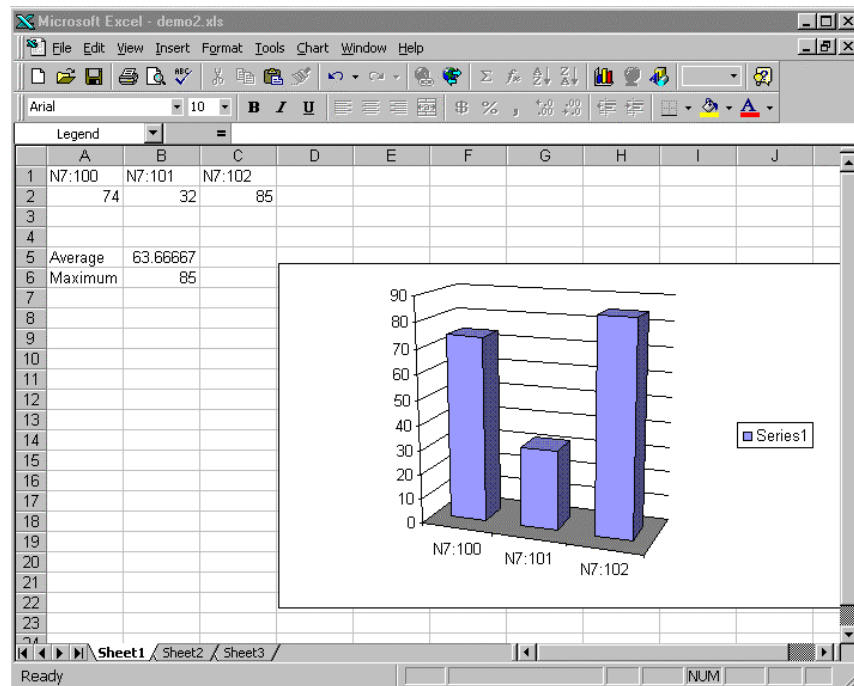
- Right click on the .PPS filename and choose the Create Shortcut selection. Once the shortcut is created, place it on the Windows desktop.
- To run a PMPC configuration in unprotected mode, do the following
 - Right click on the new icon and choose the Properties selection.
 - In the Shortcut Properties dialog box, choose the Shortcut Tab.
 - In the Target field, enter the PMC.EXE pathname, the .PPS configuration filename, and the unsecure mode parameter for the Runtime Software. Note that the unsecure mode parameter is entered to allow you to view both the DDE Server and the DDE Client applications.

For an example of an entry in the Target field, refer to the line below.

```
c:\pmconfig\ntonline\pmc.exe demo.pps -u
```

For more information on running PanelMate PC applications, refer to the PanelMate PC Runtime Operation User's Guide.

The following figures display how the Microsoft Excel application and the PanelMate PC configuration may appear.



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