IBM

PlantWorks: 2.3 Upgrade
Upgrading and Using PlantWorks 2.3
Memo To Users

Welcome to PlantWorks 2.3

This document along with the accompanying disks will upgrade your PlantWorks 2.2 system to PlantWorks 2.3. PlantWorks 2.2 must already be installed on your system in order to use this upgrade package. If you do not have PlantWorks 2.2 installed on your system or if you are using PlantWorks 2.1, you cannot use this upgrade package to install PlantWorks 2.3. Instead, you must order the full PlantWorks 2.3 product diskettes through your normal IBM distribution channel.

Note: Program Currency: Program services for Build Services/2, Release 2.3 will be available until October 31, 1996.

The first section explains how to upgrade to PlantWorks 2.3.

The second section of this document describes how to use the new features of PlantWorks 2.3. The PlantWorks publications have not been updated for this release, so your PlantWorks 2.2 publications are still valid. All differences between PlantWorks 2.2 and 2.3 are documented in this memo as well as the online help.

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Upgrading PlantWorks 2.2 to PlantWorks 2.3

This section explains how to upgrade your current PlantWorks 2.2 installation to PlantWorks 2.3. If you do not have PlantWorks 2.2 installed on your system or if you are using PlantWorks 2.1, you cannot use this upgrade package to install PlantWorks 2.3. Instead, you must order the full PlantWorks 2.3 product diskettes through your normal IBM distribution channel.

Warning: This installation procedure will overwrite some data files in the PlantWorks program directory (\ff). The following data files will be overwritten:

Warning Browser log file (\ff\vision\files\warning.log)

Initial Database files (\ff\cfg\initdb*.*)

If you need to save the information in these files for historical purposes, be sure to back them up before starting this installation. Note that the Initial Database directory (\ff\cfg\initdb) contains a copy of the original database that was shipped with PlantWorks. It does not contain your current database.

The PlantWorks 2.3 Upgrade consists of 5 upgrade disks, as well as a new Build Services/2 Installation/Reference disk, and a new Starter Services/2 Installation/Reference disk. You will only need to use one of the new Installation/Reference disks based on whether you are using Build Services/2 or Starter Services/2.

Follow these directions to upgrade to PlantWorks 2.3:

1. Shutdown the PlantWorks network if it is currently running.

2. It is recommended that you perform an OS/2 (system) backup of your \FF, \CS2 and \ICA directories on the executive node prior to beginning the PlantWorks upgrade. At the very least, you should back up your existing PlantWorks database on the executive node using the Network Definition Utility. Ensure PlantWorks is shut down prior to performing a backup.

3. Create a new Installation/Reference disk:

    a. If you have Build Services/2 installed on your system, make a diskcopy of the new Build Services/2 Installation/ Reference disk. If you have Starter Services/2 installed on your system, make a diskcopy of the new Starter Services/2 Installation/Reference disk. Keep the original copy of the new Installation/Reference disk for safekeeping.

    b. Start the 'Network Definition' application that resides in the PlantWorks Desktop Folder.

c. Insert your new copy of the Installation/Reference disk into the disk drive and select 'Save' from the 'File' menu. This will update the new Installation/Reference Diskette with your network configuration information.

d. Exit the Network Definition application.

e. This new Installation/Reference disk replaces the original Installation/Reference disk that you created when installing the GA version of PlantWorks 2.2, or when installing any of the PlantWorks 2.2 PTFs. You should use the new version of the Installation/Reference diskette from now on.

4. Install the upgrade disks:

a. If the PlantWorks 2.3 upgrade is to be installed on multiple nodes, ensure the installation procedure is performed at the executive node and that Communications System/2 is running on each remote node to be updated. If Communications System/2 is not started on a node,

Select the PlantWorks folder from the OS/2 desktop on that node. The PlantWorks Icon View window appears.

Select the Start Communications System/2 icon. Communications System/2 is started.

b. Start a 'PlantWorks windowed environment' or 'PlantWorks full-screen environment' by double-clicking on the appropriate icon in the PlantWorks Desktop Folder.

c. Insert the first Upgrade Disk (Disk 1) into your floppy drive.

d. From the PlantWorks environment window, change to the root directory of the floppy drive and start the install.cmd file. If your floppy drive is a:, you would type in the following:

```
a:
cd \
install
```

e. Select 'Install PW Diskettes' in the Network Definition window. The install PW Diskettes dialog box appears with the executive node displayed in the 'Local Node to Install' field.

f. Highlight the executive and all the remote nodes in the 'Other Nodes to install' list box. If you want to install additional nodes, they must be defined and configured with Communications System/2 currently running.

g. Select 'OK' in the Install PW Diskettes dialog box to initiate the installation of the upgrade. A PlantWorks Installation message box appears.

   If the local node is not able to communicate with a selected remote node, a message is displayed and the upgrade will not be installed on the node.

h. Follow the prompts to install all 5 of the upgrade disks.

i. When you are finished installing the upgrade disks, Exit the Network Definition application.

5. Start PlantWorks on the Executive Node.

   The first time you start PlantWorks on the Executive node, your PlantWorks 2.2 database will be automatically migrated to version 2.3. After the PlantWorks startup window displays the message

   "Starting Process rp"

   and the PlantWorks Service Control window appears, you'll see another message in the startup window saying

   "Upgrading Version 2.2 Database to Version 2.3. Please Wait..."

   Do not begin using PlantWorks while the database migration is being performed. After a minute or so, you will see a message saying

   Upgrade to Version 2.3 is complete.
   PlantWorks Initialization Complete.

   Once this message appears, you may begin using PlantWorks 2.3. You may also startup your remote nodes at this time.

Using PlantWorks 2.3

This section describes all of the new functions in PlantWorks 2.3. The PlantWorks publications have not been updated for this release, so your PlantWorks 2.2 publications are still valid. All new features in PlantWorks 2.3 are described in this document as well as in the online help.

Enhancements to Runtime Monitor

Multiple Runtime Monitor Sessions.

The **Runtime Monitor** option, under the **Runtime** menu selection on the PlantWorks Service Control window has been changed. It now brings up a second menu, which the user can select from one of four separate Runtime Monitor (RTM) sessions. Each session runs completely independent of the others. Be aware that each RTM session uses approximately 1 megabyte (mb) of the PlantWorks shared memory pool. You may find that you can no longer execute services when all four RTM sessions are running, because the shared memory pool is out of space. If you plan on running multiple RTM sessions, you may have to change the **sm_total_size** value in the PlantWorks VCONFIG. file. The default value for this VCONFIG. variable is 5.0mb, or 5 megabytes. This may need to be increased to accommodate the additional RTM sessions.

As a Runtime Monitor session is started, it registers itself with the other RTM sessions that are running. This provides a means of switching from one session to another. For example if you start all four RTM sessions, additional menu selections will be added to the **Exit** pull-down RTM menu selection. RTM session 1, will have menu selections for RTM sessions 2, 3, and 4. Likewise, RTM session 2, will have menu selections for RTM sessions 1, 3, and 4, RTM session 3, will have menu selections for RTM sessions 1, 2, and 4, and RTM session 4 will have menu selections for RTM sessions 1, 2, and 3. These menu selections are only available when the RTM session is running. So if RTM session 1 is the only session running, the **Exit** pull-down menu will not have any additional options. If RTM sessions 1 and 2 are running, each will have a new menu option for the other, but there will not be menu options for sessions 3 and 4.

Taking the example of starting all four RTM sessions one step further, pressing the CTRL+1 accelerator key from RTM sessions 2, 3, or 4, will bring RTM session 1 to the foreground. Control of the system will pass to RTM session 1 from the RTM session that initiated the CTRL+1 key sequence. The CTRL+ session number key sequence applies to all active RTM sessions. The four sessions will also share Supervisor Override privileges. So a supervisor override initiated in one session carries over to all other active RTM sessions.

Specifying Base Displays in Network Definition

In Network Definition, you can specify a different base display for each of the four Runtime Monitor sessions. The base display is the default display that is shown when Runtime Monitor is first started.

In Network Definition, go to the "Set Up Node" window. A button was added to access the "Runtime Monitor Displays" window. In that window, you can specify from one to four Runtime Monitor Sessions. You can also specify the start up options for each session.

Once in the "Runtime Monitor Displays" screen, you will see four entry fields, each with two check boxes next to them. These entry fields are labeled as such:

Runtime Monitor Display 1:

Runtime Monitor Display 2:

Runtime Monitor Display 3:

Runtime Monitor Display 4:

The two checkboxes are labeled:

Start.

Iconize.

Base Display Entry Fields: In each of the entry fields, specify the base display you want to be displayed when each Runtime Monitor session is started. If the entry field for Display 1 is left blank, then the default display, WRL:BASE, will be used. If the entry field for Displays 2, 3,or 4 are left blank, then the display specified for Display 1 will be used. If Display 1 is blank, then the default display, WRL:BASE will be used.

Start Runtime Monitor Check Boxes: These check boxes, when checked, will force the automatic start of the specified Runtime Monitor Base Displays when PlantWorks is started.

Iconize Runtime Monitor Check Boxes: These check boxes, when checked, will force the start of the specified Runtime Monitor Base Displays as an icon on your desktop.

Saving the Runtime Monitor Window Position

A feature has been added to Runtime Monitor, to allow the user to save the location and size of the Runtime Monitor window. Once this information has been saved, the window will return to the location and size whenever it is first started. The default size is a maximized, full screen window. To save a different size and position, first size the window and move it to the desired saved location. Now the information can be saved by either pressing the CTRL+V accelerator key or by selecting the **Save Runtime Window Position** menu option below the **Actions** drop-down menu selection.

More Items per Runtime Monitor Display

Runtime Monitor and Display Definition have been enhanced to allow 1500 items on a display. The previous limit was 335.

Runtime Control Security Feature

Runtime Monitor and Display Definition have also been enhanced to disable all Presentation Manager (PM) controls on the Runtime Monitor screen for users with a low security level. This in effect locks the user on to the Runtime Monitor screen. They cannot close, size or move the Runtime Monitor window or change to another PlantWorks service. Due to the architecture of OS/2, the CTRL/ESC, ALT/ESC, and ALT/CTRL/Delete key combinations cannot be intercepted. A user still has the ability to close Runtime Monitor or switch to a different OS/2 session from the OS/2 task list. The user also has the ability to reboot the PC.

How to Use the Runtime Control Feature

The Runtime controls security feature utilizes the existing PlantWorks security system to limit the Runtime capabilities of certain users. You must use the User Access screens to set up a group of users and associate a numeric security level with the users. See the PlantWorks documentation for a detailed explanation on how to add users to the PlantWorks system. Chapter 9 in the book, "Installing and Configuring PlantWorks" is about "Setting Up Restricted Services". You can also refer to the online help for the User Access window and the Service Access window for more information.

Access to the Runtime controls must be defined for each display in the Display Definition build time service. It is implemented in a manner similar to the display Read and Write security access. Under the Display Definition, **File** menu option, is a menu selection called **Display Control**. This option allows the user to define the Read and Write security levels for a display. There is a new field on this screen, **Runtime Control Security**. Place a value in this field to act as a security benchmark. Users with security levels less than the value in this field will not have access to the PM controls on the Runtime Monitor screen. Users with security levels greater than or equal to the value in this field will have the full access capabilities they currently have. A value must be entered into this field for every installed display, for this security to take affect for the display. Doing this for every display will ensure that a user's access is consistent regardless of the display active in Runtime Monitor.

Examples of the Runtime Monitor Control Feature

A user starts up PlantWorks and logs in. His security level is 49. The user starts up a Runtime Monitor session and the base display is brought up. The base display has a Runtime Controls Security level of 50. Runtime Monitor is brought up in a full screen mode. The user cannot size or move the window. The minimize and maximize buttons are disabled. The ALT F4 key, which shuts down Runtime monitor, is disabled. The Exit to service control window and the IO point options are all disabled. In fact the entire menu bar is hidden from the user. The user has the ability to access any of the base Display menu options, the Supervisor Override option, and if a Runtime dialog box is behind Runtime Monitor, the Runtime Dialog option under the **Exit** menu selection. These services can only be accessed by pressing the correct CTRL+ key option. CTRL+B brings up the Base display, CTRL+S brings up the prompt to Select a display, CTRL+O brings up the prompt for a Supervisory Override.

A user with an access level > 50 could log in under the Supervisor Override option and have full access rights restored. In this case the supervisor can restore the hidden menu by selecting CTRL+M. IO Point select service is available under the actions menu selection, and the screen can be sized, moved and minimized. The restrictions are put back in place when the user with the access level > 50 logs out, from the supervisor override option, using the Supervisory Login Override End option.

In a second example, the base display has a Runtime controls security level of 50. The user with security level of 49 is logged into the system. The Runtime controls restrictions are in place. The supervisor, with a security level > 50 logs in and chooses the select display option. A new display is loaded and it has a Runtime security level of 20. The supervisor logs out using the Supervisory Login Override End option. The user with the security level of 49 now has access to all of the Runtime controls. This is because the new display has a Runtime control security level of 20, which is less than the users security level of 49.

In summary, the Runtime Monitor Controls security level is set in Display Definition under the **Display Control** option below the **File** drop-down menu selection. Once installed, the security access is used by Runtime Monitor service to prevent users from moving, sizing, or shutting down the Runtime Monitor service.

48 Softkeys

The number of softkeys available for use has been expanded from 16 to 48. You can now define all 12 function keys as softkeys. In addition you can supplement the definition of a softkey with either a Shift, CTRL, or ALT state key, enabling 48 softkeys. Be aware that a softkey definition takes precedence over an existing system defined action. Currently, when you press ALT+F4, the Runtime Monitor Session is shutdown automatically. Pressing ALT+F4 will no longer shut down Runtime Monitor, if you define a softkey using ALT+F4. Instead it will perform the Setup Operations associated with the ALT+F4 softkey. The same logic applies to the F2 key. Currently, F2 switches the user from an RTM session to the Alarm Management (AMS) component. Defining an F2 softkey disables the ability to switch to AMS. The actions defined in the Setup Operations for the F2 softkey will be performed.

Switching to the Alarm Management Service

As mentioned in the previous discussion concerning the 48 softkeys, defining the F2 key as a softkey disables the ability to jump to the Alarm Management service (AMS). A new hot key combination, CTRL + A, has been defined that will perform this function, whether or not the F2 key has been defined as a softkey. The ability to jump to the AMS component has also been added as a menu option, under the **Actions** pull-down menu in Runtime Monitor. This option is entitled **Alarm Management** The F2 key will continue to perform this function, as long as it is not defined as a softkey.

Hiding the Menu

Runtime Monitor has been enhanced to allow you to hide the menu at the top of the screen. This allows you to make use of this space during definition time. The items drawn in this area can then be accessed from within a Runtime Monitor session. CTRL+M is the accelerator key that will Hide and Restore the menu bar from the top of

the Runtime Monitor screen. This is also available as an option under the **Exit** pull-down menu in Runtime Monitor. This option is entitled **Hide Runtime Controls**

Trend Analysis

Overview of the Trend Analysis Tool

The PlantWorks Trend Analysis tool is a new component that is used to graphically represent data values in a real-time environment. This tool can also represent historical data values by reading and plotting data from a PlantWorks logset file. It was developed to replace the Trend Plot and History Plot displays found on Runtime Monitor. Those two displays remain for compatibility with older versions of PlantWorks. There is no migration utility that spans the two tools, but the setup of a trend takes only a few minutes and is well worth the effort.

As with the previous Trend Plot and History Plot displays, the Trend Analysis tool allows you to graph PlantWorks items of the following types: integers, floats, and flags. These types can be Working Storage variables, fields in a PlantWorks Record, or points within a PlantWorks I/O Point Set. The number of items you can plot at one time has been increased from 4 to 10, with this new trending tool. As with the existing Runtime Monitor Trend Plot screen, you can save trend definitions. This allows you to start graphing data without having to recreate the trend. This function has been extended for graphs that trend historical data read from logset files.

One of the main features of the new Trend Analysis tool is the ability to determine the data value and time stamp of any point on the graph. This is accomplished by moving the mouse pointer into the graph area and holding down the left mouse button. A vertical line will appear and the value and time stamp associated with the point on each data line will be displayed. Continue holding down the left mouse button and move it through the graph area and you will see the data values and time stamps updated immediately.

You can also scroll backward in time by clicking on the left scroll button with the left mouse button. This allows you to view the data values contained in an entire logset file or to see the characteristics of the data points that are being read real-time. The graphing of real-time data will be temporarily halted while you scroll backward in time. The data will continue to be collected in this situation, but the display of that data will be turned off while you scroll backward in time. There is a default time limit of 5 minutes for scrolling backwards through a real-time graph. After 5 minutes, the graphing of real-time data will resume. You may resume graphing anytime prior to the 5 minute limit by selecting the **Resume Real-time Trending** option, under the **View** menu selection.

Two buttons titled Y-axis, are available at the bottom of the screen. These buttons allow you to change the text and minimum/maximum amounts associated with the Y-axis. Two buttons are provided to allow you to change the information on the right axis, separate from the left axis. This has the effect of providing two separate Y axes.

Getting Started

The Trend Analysis window contains the following pull-down menu items on the menu bar:

File
View
Exit
Help

The menu items on the Trend Analysis window have a mnemonics key (shown as an underlined letter), which you can use to select the menu item without using the mouse pointer. To use the mnemonics method, hold down the ALT key and then press on the appropriate letter key.

The **File** pull-down menu contains the following choices:

Create Trend...
Get Trend...
Save Trend...
Modify Trend...

The **File** pull-down menu option is where the process of trending PlantWorks variables begins. The choices under this menu allow you to define and begin trending a group of PlantWorks variables, to open and begin trending data based on a items previously defined, to save the current trend definition, or to modify the current Trend definition.

All menu items are enabled, except for the **Modify Trend...** choice. This menu selection is disabled until either a new trend is defined or an existing trend definition is retrieved.

Creating a Trend

Select the **Create Trend...** choice from the **File** pull-down menu to define the PlantWorks variables to be graphed and to begin the graphing of PlantWorks data items. On this window you will decide whether you will graph historical data or data in a real-time manner. For historical data, you will select a logset file from a list of currently active logsets. For real-time, you will provide a rate at which data will be read and plotted. For both methods, you specify the PlantWorks item, the minimum and maximum values the item will be plotted against, the Y-axis text associated with the item, the color of the item's graph line, and a display offset to use when graphing the item's data value.

The Trend Configuration window is displayed when you select the **Create Trend...** choice. The first decision the user must make is whether you will be graphing historical or real-time data. This decision is performed via the **Obtain Data from Data History File** checkbox. You elect to graph historical logset data by placing a checkmark in this box. The checkbox is checked by default.

A listbox containing the names of all active logset files is displayed immediately to the right of the **Obtain Data from Data History File** heading. This listbox is active only when the checkbox is checked. You will be able to scroll through the list of logsets and select the one from which data will be read. Current PlantWorks logsets are those logset files that exist in the \FF\VISION\FILES\DLT\CUR subdirectory.

Do not check the Obtain Data from Data History File checkbox if you want to graph data in a real-time manner. The list box of current logset files will be disabled when the

checkbox is not checked. The **Refresh Rate** field will be enabled when this checkbox is not checked. For real-time trending you will specify the time interval in seconds, at which you would like the Trend Analysis tool to read and graph the real-time data. Valid entries for this field are integers between and including 1 and 60. The default value is 5 (5 seconds).

Defining PlantWorks Variables

Ten rows of fields are provided to supply information specific to each PlantWorks variable to be graphed. The variable specific fields on the Trend Configuration window are:

Variable
Minimum Value
Maximum Value
Units
Color
Offset

The **Variable** field is where you specify the PlantWorks variable that you would like to trend. For trends based on historical logset data, the PlantWorks items contained in the logset that was selected from the list of logset files, will be loaded into each of the 10 Variable list boxes. You will then be able to scroll through the list of PlantWorks items in each Variable list box and select the item that you would like to trend.

For real-time trending, you may type the name of any PlantWorks item that is valid for trending. A valid, trendable PlantWorks item is any item that is numeric (INT1, INT2, INT4, or FLOAT) or a FLAG. This item can be a working storage item, a record item, or an item in a PlantWorks I/O Point Set. Local and Remote (items installed on a node other than the node you are currently on) PlantWorks items can be trended at the same time on the same graph.

Verification will be performed to ensure that each item is a valid, trendable PlantWorks item. Further verification will be performed when graphing Remote items, to ensure that the node on which the Remote variable is installed, is currently up and communicating with the Local node.

You will specify the minimum and the maximum Y-axis value for each PlantWorks variable to be graphed. Both values must be positive integers. The value in the **Minimum Value** field must be less than the value that will be entered into the **Maximum Value** field. The actual value read for the variable being plotted will be represented graphically as a percentage between the minimum and maximum values. For example, for minimum value of 0 and a maximum value of 1000, a data value of 500 will be graphed in the middle of the trend display.

The **Units** field is an 8 character field in which you can enter a description of what the minimum and maximum values represent. This will be displayed as the Y-axis text for this item.

You can choose the **Color** of each line by selecting a color from the list that appears when you click on the Color listbox. There are currently 13 colors available: Red, Pink,

Green, Cyan, Yellow, Brown, Blue, Dark Gray, Dark Green, Dark Blue, Dark Red, Dark Pink, and Dark Cyan.

A PEL is a term which identifies the number of dots on a display. For VGA displays, there are 640 horizontal PELS and 480 vertical PELS on the display.

The final field on the Trend Configuration window is the Offset field. Optionally, you may provide a number of PELS by which the graphical display of a point will be vertically offset by. This field must be positive and larger than zero. The use of this **Offset** field is best explained with an example of what happens when trending two PlantWorks flag items.

When trending two flags, the Trend Analysis tool will plot the value of the first flag and then plot the value of the second. If a flag is true it will be plotted as if its value is one and if it is false it is plotted as if its value is zero. In our example if both flag A and flag B are true, the Trend Analysis tool will plot flag A as 1 and then plot flag B as 1. Visually, only one trend will be visible, flag B's since it was plotted on top of Flag A.

Now in the same example of plotting two flags, flag A and flag B, we provide flag A with an offset value of 5. Now when both flags are true, we plot flag A 5 PELS higher than we normally would have plotted it. Flag B is then plotted in the normal fashion. In this instance, both trend lines are visible because we offset the display of flag A by 5 PELS. The value of both fields are the same, the display of the trend line has been altered.

Three push buttons are provided at the bottom of the Trend Configuration window that allow you to decide what action to take next. Click on the **OK** button to apply your changes to the graph, close the Trend Configuration window, and begin trending the variables. Click on the **Cancel** button to close the Line Configuration window without applying any changes. Trending will not occur if the **Cancel** button is selected. Additionally, there is a **Help** button that can be pressed at anytime while using this screen. This will provide a general description of the Trend Configuration window, with references that give detailed explanations of the purpose of each field.

Saving a Trend Definition

You should now be viewing the graph of the PlantWorks variables that were defined on the Trend Configuration window. A **Save** option is available below the **File** pull-menu to allow you to save the information entered on the Trend Configuration window. Selecting the **Save** option will display the Save Trend window.

The Save Trend window contains the following fields and buttons:

Save Trend Definition as
Description
Save
Cancel
Help

Enter the name that you would like to save this trend configuration as in the **Save Trend Definition as** field. Up to 8 characters (no spaces) are allowed. The extension .TRN will be appended to the name provided in this field. It is not necessary to enter the .TRN

extension as part of the file name. A file will be created in the \FF\VISION\FILES\DLT\CUR directory called XXXXXXXX.TRN, where XXXXXXXX represents the name entered in this field.

Enter up to 50 characters in the **Description** field, to further help identify this trend configuration. This description, along with the file name, will be displayed when you perform a **Get Trend** operation.

There are three push buttons available on the Save Trend window. Click on the **Save** button, to write the current trend configuration out to a file. The file will be written to the \FF\VISION\FILES\DLT\CUR directory. Click on the **Cancel** button to cancel the request to save the configuration information to a trend definition file. Control will return to the Trend Analysis window, without saving the trend configuration information. Additionally, there is a **Help** button that can be pressed at anytime while using this screen. This will provide a general description of the Save Trend window, with references that give detailed explanations of the purpose of each field.

Retrieving a Saved Trend Definition

Now that you have saved trend definitions to a file, there is no longer a need to define the information contained on this trend. The **Get Trend** option allows you to read the previously saved information from the trend definition file. Trending of the variables defined in the trend definition file will begin once the file has been successfully read.

Use the Get Trend window to select and begin trending a previously defined trend. A list box is displayed on the Get Trend window that contains the names and descriptions of trend definition files that were created using the **Create Trend** option and were saved using the **Save Trend** You may scroll through the list of trend definitions using either the up and down arrow keys or selecting the up/down vertical scroll buttons on the right side of the listbox.

The Get Trend window contains the following buttons:

Get
Cancel
Help

Click on the **Get** button, while a trend definition file is highlighted in the Definition file list box. This will load the configuration information about that trend into memory. Trending of the variables will begin, once each item has passed the validation checks to ensure its existence and that it is still a trendable PlantWorks variable. Click on the **Cancel** button to cancel the request to get a trend definition file. Control will return to the Trend Analysis window, without loading a trend definition file. Additionally, there is a **Help** button that can be pressed at anytime while using this window. This will provide a general description of the Get Trend window, with references that give detailed explanations of the purpose of each field.

Modifying a Trend Definition

Select the **Modify Trend...** choice from the **File** pull-down menu to return to the Trend Configuration screen. The values associated with the current trend will populate the fields on the Trend Configuration screen. You will then be able to make any modifications to the current trend. For information concerning the Trend Configuration screen, see the section titled **Creating a Trend**

Different Views of the Trend

The **View** pull-down menu from the main Trend Analysis window provides various options to alter the display of the Trend Analysis graph. The **View** pull-down menu contains the following choices:

Time Intervals
Grid
Trend Data As
Resume Real-time Trending

All menu items are enabled, except for the **Resume Real-time** Trending choice. This menu selection is disabled until the user halts real-time trending to scroll through the graph. The user resumes the graphing of the data through this menu option.

Specifying a Time Interval

The **Time Intervals** option allows you to change the time frame of the display (width of the X-axis). The X-axis is marked by vertical bars which indicate a specific time interval. By default the display width for the X-axis is five minutes and each vertical bar represents a 50 second time interval. Selecting the **Time Intervals** option displays a window that allows you to specify a different display width.

The Time Interval Configuration window contains one field, **Display Width** It also contains three buttons:

OK
Cancel
Help

The **Display Width** field contains the value of the display width for the X-axis of the graph. The X-axis is marked by vertical bars which indicate a specific time interval. By default the display width for the X-axis is five minutes and each vertical bar represents a 50 second time interval. You can change the display width by entering a whole or decimal number followed by one of the following units:

S Seconds The minimum value you can enter is 6 seconds.

M Minutes

H Hours

D Days

W Weeks

Y Years

The display width that you enter is always rounded to the nearest multiple of 6 seconds. For example, typing **50s** in the **Display Width** field sets the X-axis display width to 48 seconds.

When you specify a display width value, the Trend Analysis component converts the value to the largest practical unit of measure. For example, if you specified a display width of 7 days, it would be converted to 1 week.

The maximum display width value is 1 year (1y).

Click on the **OK** button to apply the changes you made to the X-axis, exit the Time Intervals window, and return to the Trend Analysis window. Click on the **Cancel** button to exit the Time Intervals window without saving any changes. Additionally, there is a **Help** button that can be pressed at anytime while using this window. This will provide a general description of the Time Intervals window, with references that give detailed explanations of the purpose of each field.

Turning the Grid On and Off

A vertical and horizontal grid can be displayed by selecting the **Grid** option. When you select the **Grid** choice, another pull-down menu is displayed containing the following items:

Show Grid
Hide Grid

The currently selected item shows a check mark on the left side. The default is **Hide Grid**.

Select **Show Grid** to display the X-axis and Y-axis grid lines on the trend window. The **Hide Grid** option will remove the grid lines.

Displaying the Data

The Trend Analysis tool can display the PlantWorks data in one of three ways. When you select the **Trend Data As** option, another pull-down menu is displayed containing the three selections:

Actual sampled value
Rate of change
Delta value

The currently selected item shows a check mark on the left side. The default is **Actual sampled value**.

The **Actual sampled value** option reads and graphs the actual values of the PlantWorks items being trended. This is the default.

Select the **Rate of change** choice to graph the time-averaged value for the PlantWorks item. The rate of change is equal to the difference between the item's current value and the item's previous value divided by the amount of time that has elapsed since the previous query. For example, if the item's current value is 20, the previous value is 10, and the time elapsed since the previous query is 5 seconds, then the rate of change is equal to 2.

Select the **Delta value** choice when you want to graph the change between the item's current value and it's previous value. For example, if the item's current value is 20 and the previous value is 15, the delta value is 5.

Resume Trending Data

This selection is only enabled when the user has elected to halt the graphing of real-time data by scrolling backwards through the graph. Scrolling through a real-time trend is allowed, but the graphing of data must be halted. The data will continue to be collected, it just will not be displayed. Select **Resume Real-time Trending** to resume the graphing of real-time data.

Ending a Session

Select the **Exit** choice to exit the PlantWorks Trend Analysis component. The **F3** key can also be used to exit the PlantWorks Trend Analysis component. Be sure to save your configuration information before you exit the session. They will not be carried over to another session unless you save the information.

Display Definition

Find Text

This enhancement will allow the user to search for a string contained within any field of any object in display definition.

Options for finding include specifying case sensitivity, wildcard matching of zero or more characters specified by '*' or '?', and substring matching. Checking the "substring matching" box in the find dialog will match the text "the" to "The text", "There it is", etc. Without this box checked, only strings which are only "the" would be considered matches. Substring matching just adds '*' to the start and end of the string being searched for. '*' will match 0 or more characters, and '?' will match exactly one character.

Once matches are found, the user can double click on the desired line to edit the object that contains the text listed, or click on 'Go to' to edit that object.

Save and Install

A menu item has been added to the Display Definition service that will allow for saving and installing of a display directly without having to start Name Lookup to perform the install.

Toolbox Palette

The Toolbox Palette is a graphical interface containing the most used functions of Display Definition. This interface can be made visible or hidden by selecting the "Toolbox" menu edit in the "Edit" menu.

The toolbox contains buttons for many of the major functions used in Display Definition. The small window at the bottom of the toolbox contains a description of the button which the pointer is currently over. Moving the pointer over any button in the toolbox will result in a brief description being shown in this window.

This window will also track the current position of the mouse pointer when no object is selected. When object(s) are selected or moved, the current position of the lower left corner of the object as well as the width and height of the rectangle bounding the object(s) will be displayed.

Whenever a bounding rectangle is being used to select one or more objects, the starting point of the rectangle as well as the width and height of the rectangle will be displayed.

Context Menus

Context menus in display definition have been added and can be activated with the second mouse button. If the pointer is over an object, the object specific context menu will be activated. If the pointer is over the background, the main menu will be activated in context format.

Hiding the Menu

Display Definition has been enhanced to allow you to hide the menu at the top of the screen. This allows you to make use of this space during definition time. The items drawn in this area can then be accessed from within a Runtime Monitor session. CTRL+M is the accelerator key that will Hide and Restore the menu bar from the top of the Display Definition screen. This is also available as an option from the Display Definition **View** pull-down menu. This option is entitled **Replace/Remove Menu**

Finally, if you do hide the menu while in Display Definition, you still have access to every item on the menu bar through the use of a pop-up menu. This pop-menu can be displayed from within Display Definition by pressing the right mouse button once over any blank part of the screen. The pop-menu displays the menu items vertically, with the lower left corner of the menu being as close to the location of the cursor as possible.

Chain Definition

Find and Replace

This enhancement will allow the user to search for a string contained within any parameter field or function name within the current chain. It also allows the user to replace matches found for strings in parameter fields.

Options for finding include searching function names, searching parameter fields, specifying case sensitivity, wildcard matching of zero or more characters specified by '*' or '?', and substring matching. Checking the "substring matching" box in the find dialog will match the text "the" to "The text", "There it is", etc. Without this box checked, only strings which are an exact match to "the" would be considered matches. Substring matching just adds '*' to the start and end of the string being searched for. '*' will match 0 or more characters, and '?' will match exactly one character.

Once matches are found, the user can then perform a replace or go to any function that is listed. The wildcards used in the search can also be used in the replace field to perform complex replaces.

Complex Replaces:

Take the example string "This is the string".

For instance searching for "*the*" and replacing it with "*A*" will result in the string being changed to "This is A string".

Searching for "This*string" and replacing it with "That*text" will result in the string being changed to "That is the text".

Searching for "This ?? the *" and replacing it with "That ?? some *" will result in the string being changed to "That is some string".

Searching for "This * string" and replace it with "This text" will result in "This text".

The number of '*' and '?' characters in the replace string must be equal to or less than the number of '*' and '?' in the search string. The order of the wildcards must also remain the same. So searching for "This * ??? string" and replacing it with "This * text ??" will result in "This is text th" and is legal. Attempting to replace it with "This ??? text *" will result in unpredictable results and is not considered a valid replacement string.

Examples:

Examples of Find and Replace:

Find: the
Replace with: A
Search Parameters: yes
Search Function Names: no
Ignore case: yes
Substring search: yes

This will perform a search on parameter fields only, matching any field containing the substring "the", and list these matches in the listbox of the "Search Results" window.

Note that since substring search was specified, the find and replace fields will appear as "*the*" and "*A*" to match 0 or more characters on either side of the strings.

Suppose one of the matches is on a field that says "This is the parameter field". Choosing replace on this entry will result in the following change to the field "This is A parameter field".

Save and Install

A menu item has been added to the Chain Definition service that will allow for saving and installing of a chain directly without having to start Name Lookup to perform the install.

Toolbox Palette

The Toolbox palette is a graphical interface containing the most used functions of Chain Definition, and allows the user to add the most chain functions that are used most often in chains. These custom additions will remain in the palette between shutdowns of PlantWorks until the user removes them.

This interface can be made visible or hidden by selecting the "Toolbox" menu edit in the "Edit" menu.

The toolbox contains buttons for many of the major functions used in Chain Definition. The small window at the bottom of the toolbox contains a description of the button which the pointer is currently over. Moving the pointer over any button in the toolbox will result in a brief description being shown in this window.

Custom Entries:

The toolbox allows for the addition of selected functions. When the first function is added, the 'Custom Functions' button will appear at the lower right corner of the toolbox. Pressing this button will bring up a context menu with a list of the functions that were added. These functions will remain in the toolbox until the user deletes them, even after PlantWorks is restarted.

To add a function to this custom menu, a few steps are required. For example, say you would like to add the function "SET" to this menu. The procedure would be as follows:

1. Get to "Add Function" Dialog (from menu, toolbox, or via ctrl-a).
2. Choose the "Lookup Function" button.
3. In the "Lookup Functions" dialog, select "MATH" in the first listbox, then "SET" in the second listbox.
4. At the bottom of the "Lookup Functions" dialog, there are "Add Custom" and "Delete Custom" buttons. Press "Add Custom".
5. Exit all dialogs.

Going to the toolbox now and pushing the "Custom Functions" button will show the "SET" function. Now, when you want to add "SET" to your chain, simply choose the custom menu and select "SET". An "Add Function" dialog will appear with "SET" already selected and the parameter fields ready to be filled in. Multiple functions can be added to this menu.

Removing functions from these menu is done in the same manner, except you choose "Delete Custom" instead of "Add Custom".

These custom menu items are stored based on node, and will appear the same for all users on that node. Any changes to the custom menu will affect all users of that node.

Chain Functions

String Functions

The string functions let you manipulate PlantWorks CHAR variables as well as PlantWorks records. When you use a PlantWorks record, it should be defined as multiple CHAR variables. The string functions will then treat the record as one long string.

The string functions are:

STRCAT - Concatenate source string into destination string
STRCPY - Copy source string into destination string
STRSET - Set String Characters
STRLEN - Get String Length
STRRES - Resolve PlantWorks Variables in String

STRCAT - Concatenate source string into destination string

Keywords: **Strings***:* This function will concatenate the contents of the source string onto the end of the destination string. A blank character can optionally be placed in between the two strings.

The function will search from the end of the destination string (**DestString**) for the first non-blank character to determine the starting point for the concatenation. The contents of **SrcString** will then be copied into the end of **DestString**. If the user specifies **PadFlag** as TRUE, then a blank character will be placed in between the two strings.

If the length of the two concatenated strings is greater than the length of **OutStr**, then the strings are not concatenated and an error is returned in STATUS.

Input Only Parameters:

SrcString The character array you want to concatenate into **DestString**.

Types: CHAR or RECORD(CHAR fields).

PadFlag If **TRUE**, a blank character will be placed between the two strings.

Type: FLAG.

Modify Parameters:

DestString The character array you want **SrcString** concatenated into.

Type: CHAR or RECORD(CHAR fields).

STATUS Return Value:

0 The function executed successfully.

2032 The size of Source String is not correct. If you're using a record of CHAR strings, the record can only be a one dimensional record, and the total size of the record can not exceed 4k (4096 bytes).

2033 The size of the Destination String is not correct. If you're using a record of CHAR strings, the record can only be a one dimensional record, and the total size of the record can not exceed 4k (4096 bytes).

2034 The size of the Destination String is not big enough to hold the Source String, the operation was not performed.

STRCPY - Copy source string into destination string

Keywords: **Strings***:* This function will copy the contents of the source string into the destination string.

If the length of the source string is greater than the length of the destination, then the string is not copied and an error is returned in STATUS.

Input Only Parameters:

SrcString The character array you want to copy into **DestString**.

Types: CHAR or RECORD(CHAR fields).

Modify Parameters:

DestString The character array you want **SrcString** copied into.

Type: CHAR or RECORD(CHAR fields).

STATUS Return Value:

0 The function executed successfully.

2032 The size of Source String is not correct. If you're using a record of CHAR strings, the record can only be a one dimensional record, and the total size of the record can not exceed 4k (4096 bytes).

2033 The size of the Destination String is not correct. If you're using a record of CHAR strings, the record can only be a one dimensional record, and the total size of the record can not exceed 4k (4096 bytes).

2034 The size of the Destination String is not big enough to hold the Source String, the operation was not performed.

STRSET - Set all characters in string

Keywords: **Strings***:* This function will set all characters in the destination string to the specified character.

Input Only Parameters:

SetChar The character you want placed into **DestString**.

Type: CHAR

Modify Parameters:

DestString The character array you want filled with the character specified in **SetChar**.

Types: CHAR or RECORD(CHAR fields).

STATUS Return Value:

0 The function executed successfully.

2033 The size of the Destination String is not correct. If you're using a record of CHAR strings, the record can only be a one dimensional record, and the total size of the record can not exceed 4k (4096 bytes).

STRLEN - Calculate length of the character string

Keywords: **Strings***:* This function will calculate the length of the source string. The length of the string is defined as the number of characters from the beginning of the string to the last non-blank character in the string.

Input Only Parameters:

SrcString The character array whose length will be calculated.

Type: CHAR or RECORD(CHAR fields).

Modify Parameters:

Size The calculated size of the **SrcString**.

Type: INT2.

STATUS Return Value:

0 The function executed successfully.

2032 The size of the Source String is not correct. If you're using a record of CHAR strings, the record can only be a one dimensional record, and the total size of the record can not exceed 4k (4096 bytes).

STRRES - Resolve PlantWorks variables in string

Keywords: **Strings***:* This function will copy then contents of the source string into the destination string replacing any PlantWorks variable names with the current value of the variables.

For details and restrictions related to imbedding PlantWorks variables into strings, see the next section.

Input Only Parameters:

SrcString The character array that contains PlantWorks variable names.

Types: CHAR or RECORD(CHAR fields).

Modify Parameters:

DestString The character array that will contain the contents of **SrcString** with the PlantWorks variable names resolved to their current value.

Type: CHAR or RECORD(CHAR fields).

STATUS Return Value:

0 The function executed successfully.

2032 The size of the Source String is not correct. If you're using a record of CHAR strings, the record can only be a one dimensional record, and the total size of the record can not exceed 4k (4096 bytes).

2033 The size of the Destination String is not correct. If you're using a record of CHAR strings, the record can only be a one dimensional record, and the total size of the record can not exceed 4k (4096 bytes).

Imbedding PlantWorks Variables in Strings

Some PlantWorks functions allow you to imbed the names of PlantWorks variables into a CHAR string. When these functions are run, the variable names are resolved to their actual values.

PlantWorks variables can be imbedded in the parameter strings of the following functions:

STRRES
DBSELECT
DBINSERT

DBUPDATE
DBDELETE
DBSQL

The following rules should be followed when placing PlantWorks variable names in the input string:

Each PlantWorks variable name must be preceeded by a colon (:) character. If you want to use the colon character in your string, type the colon character twice and it will be resolved into a single colon.

The function will determine the end of the variable name upon finding a blank, quote mark, closing parenthesis, or comma character.

The PlantWorks variable's value will be converted into a character string.

A flag variable will be replaced with the string TRUE or FALSE.

The following variable types can be imbedded:

- CHAR
- INT1, INT2, INT4
- FLOAT
- FLAG

These variable types can also be part of an array or record format.

Restrictions: The following restrictions apply to imbedded variables:

You cannot imbed the names of local chain variables.

Imbedded PlantWorks variables are not resolved during **Check Function**, **Error Check**, or **Chain Install** operations. Therefore, incorrect variable names or types will not be detected until the function is run.

Since the resolution of PlantWorks variables is performed at runtime, the Executive Node must be up and running in your network when the STRRES or SQL functions are performed. If the Executive Node is note available, then the functions will return a bad STATUS code and the resolution will not occur.

Examples: Here are some examples of input strings:

":SCO:NAME's pets:: :SCO:PETS"

will resolve to **"Scott's pets: Dot and Bat"**.

assuming the PlantWorks variable SCO:NAME was set to 'Scott' and SCO:PETS was set to 'Dot and Bat'. Note that the two colon characters after 'pets' were resolved to a single colon.

"SELECT * FROM :SCO:TABLES 2".TABNAME WHERE PARTNO=:SCO:PART AND COLOR=':SCO:COLOR' "

will resolve to **"SELECT * FROM PARTS WHERE PARTNO=12 AND COLOR='RED' "**

Message Functions

CREANCB - Create ANCB

The CREANCB has been enhanced to allow up to 100 ANCBs to be created. Previously, the limit was 32. This increase allows you to have more chains waiting on a DAERECV function.

Display Functions

DISDISP2 - Displays a display for a specific Runtime Monitor session

This function allows a user to select a specific Runtime Monitor session to which to display a display. The valid number of the Runtime Monitor session is between 0 and 4.

This function is similar to the existing DISDISPL function. However, the DISDISP2 function only displays a display to a given Runtime Monitor session specified by the user. In contrast, the DISDISPL function displays a display to all active Runtime Monitor sessions and the user cannot specify the Runtime Monitor session.

If you try to display a display in a Runtime Monitor Session that is not running, a message will be logged in the Warning Browser and the display will not be shown.

For additional information, refer to the section in this document about enhancements to Runtime Monitor.

SQL Functions

The PlantWorks SQL functions have been enhanced to allow PlantWorks variables to be imbedded into their character string parameters. See the previous section for information on imbedding PlantWorks variables into strings. Also, see the online help for the SQL functions for more details.

Debugging Your SQL Statements

When you use the DBSQL, DBINSERT, DBUPDATE, DBSELECT, or DBDELETE function, an SQL statement is generated and passed to DB2/2 for processing. In release 2.2, if you had a syntax error in your SQL statement PlantWorks would return a generic -516 sqlcode in the EXSTATUS field. PlantWorks will now return a more descriptive

sqlcode in the EXSTATUS field if you have a syntax error, such as an invalid database table name, in your SQL statement.

If the sqlcode still doesn't help you determine where the error is in your SQL statement, PlantWorks now provides a debug option. When the debug option is enabled, PlantWorks will log the SQL Statement, SQL error message and SQLCA structure returned by DB2/2. The information will be logged in the \FF\VISION\FILES\VOS_LOG0 file.

Follow these steps to turn on the debug option:

1. While PlantWorks is running, open a PlantWorks windowed environment screen.
2. In the PlantWorks command window type: **vstat** This will start the debug facility. For each of the prompts listed below, type in the response which is shown in bold type. These commands are case sensitive, so type them exactly as shown.

   command: **Da**
   Empty line means wildcard unless otherwise noted.
   Debugging level (error, warn, syscall or or info): **error**
   Process name (blkbld, datman etc.): **sqlchild**
   Component name (vos, et etc.): **(Just hit the enter key)**
   command:

3. The debug option has now been activated. Don't do anything else in this PlantWorks window until you are ready to turn off the debug option. You should leave this window at the **command:** prompt.
4. Now run the chain that contains the SQL function that is causing an error.
5. After the error has occurred, look at the \FF\VISION\FILES\VOS_LOG0 file. This file is usually locked while PlantWorks is running, so you can't view it with an editor. Instead, type the file into a temporary file:

   ```
   type \FF\VISION\FILES\VOS_LOG  > tempfile
   ```

   Now you can look at **tempfile** with an editor. At the bottom of the file, you should see an entry similar to this example:

   ```
   3/25/96 16: 3:27   sqlchild T1 - Error during PREPARE of SQL statement
   3/25/96 16: 3:27   sqlchild T1 -        SQL statement causing the error:
   3/25/96 16: 3:27   sqlchild T1 -              SELECT   FROM STAF
   3/25/96 16: 3:27   sqlchild T1 -        SQL Error Message:
   3/25/96 16: 3:27   sqlchild T1 -              SQL 2 4N    "USERID.STAF" is an
                                                      undefined name. SQLSTATE=52  4
   3/25/96 16: 3:27   sqlchild T1 -        SQLCA values returned from DB2:
   3/25/96 16: 3:27   sqlchild T1 -                SQLCODE: -2 4
   3/25/96 16: 3:27   sqlchild T1 -               SQLERRMC: USERID.STAF
   3/25/96 16: 3:27   sqlchild T1 -                SQLERRP: SQLRSMT2
   3/25/96 16: 3:27   sqlchild T1 -                SQLERRD: -3 85 , , , , ,
   3/25/96 16: 3:27   sqlchild T1 -                SQLWARN:
   3/25/96 16: 3:27   sqlchild T1 -               SQLSTATE: 52  4
   ```

   As you can see, the log file contains the actual SQL statement that PlantWorks sent to DB2/2. It also contains the text of the error message that was returned by DB2/2. Finally, the fields in the SQLCA structure are listed. For more information on the SQLCA structure, see the DB2/2 SQL Reference manual.

6. Once you have determined your error, turn off the debug option by entering the following commands in the PlantWorks window that still contains the **command** prompt.

command: **DC**
command: **q**

7. The debug option has now been turned off.

DBCONN - Connect to a SQL Database

The DBCONN function has been enhanced to connect faster. A revised manual page for the DBCONN function follows.

Keywords: **Database**, **SQL***:* This function connects your PlantWorks application to the SQL database you specify. The DBCONN function is part of the function set used to build chains for DB2/2 database processing.

The function returns a *handle*, a value that identifies the database to PlantWorks. Use this handle in the other PlantWorks functions that interact with this SQL database.

Note: Before PlantWorks can execute a chain containing the DBCONN function, you must start DB2/2 and login with a userid and password. This must be done on the node where the chain executing the DBCONN function resides.

The default number of concurrent database connections allowed is 4 per node. If you need more than 4 concurrent database connections on a node, do the following:

Add the following line to the \FF\VISION\FILES\VCONFIG file on each node that requires more than 4 concurrent database connections:

MaxDBCon: nn

where 'nn' is the maximum number of concurrent connections needed. This number cannot be greater than 64.

You may need to make adjustments to the DB2/2 configuration to handle the increased number of connections. This can be done with the DB2/2 Configuration Tool.

The DBCONN function will bind the PlantWorks SQL program to the database using the DB2 BIND WITH OPTIONS API (SQLBIND), if necessary. If an error occurs during the SQLBIND, there may be some error messages logged in the \FF\VISION\FILES\SQLBIND.LOG file. PlantWorks performs the SQLBIND with the following options:

/K=ALL Record blocking is set to ALL
/I=UR Isolation level is set to Uncommitted Read

You may specify different SQLBIND options by creating a file called \FF\VISION\BIN\PWSQLBND.CMD which contains the SQLBIND command along with your desired options. A sample file called \FF\VISION\BIN\SQLCMD.CMD is provided to use as a template. When DBCONN needs to issue an SQLBIND command, it will check to see if the \FF\VISION\BIN\PWSQLBND.CMD file exists. If it does, then a SYSTEM command will be issued to run your pwsqlbnd.cmd file. If the pwsqlbnd.cmd file doesn't exist, then PlantWorks will make the SQLBIND call internally. Note that the internal SQLBIND is much faster than using the pwsqlbnd.cmd file.

Input Only Parameters:

ConnStr The variable name or character string that contains the name of the SQL database to which you want to connect your PlantWorks application.

Type: CHAR.

Note: Previous versions of PlantWorks required you to place an '@' character before the name of the database. This is no longer necessary, however, the '@' character will still be accepted to remain compatible with existing PlantWorks applications.

Modify Parameters:

DbHndl The handle (PlantWorks identifier) assigned to the connected database.

Type: INT1.

STATUS Return Value:

0 The function executed successfully.

522 The database handle is invalid.

523 The connecting string is invalid.

524 PlantWorks cannot obtain the database handle.

533 An error occured during an SQLBIND using the user's pwsqlbnd.cmd file. See the \FF\VISION\FILES\SQLBIND.LOG file for more information.

6500 A SQL statement error occurred. The SQLCODE returned by DB2/2 is in the variable EXSTATUS.

Common SQLCODEs returned in EXSTATUS:

-1032 No Start Database Manager command was issued

-1093 The user is not logged in

Form Definition

Form Size Increased

The maximum size of forms has been increased to a width of 127 characters and a height of 13 fields. This increased size should be used cautiously as it can exceed the size of low resolution screens (640x480), but will fit in a higher resolution screen (1024x768).

Alarms

Buildtime Alarm Item Definition Has New Runtime Monitor Session Field

When creating an alarm group through Alarm Item Definition, the alarm group has a new field for the Runtime Monitor(RTM) session. The RTM session number can be from 0 to 4. If the RTM session number is zero(0), the alarms are routed to the alarm group for all RTM sessions. To select a specific RTM session, valid entries are 1 through 4.

For additional information, refer to the section in this document about enhancements to Runtime Monitor.

Alarm Priority Added to Event Log Message

This enhancement adds the alarm priority to the alarm message logged to the event log. The priority appears after the PlantWorks node name in the message.

Instructions for Using the Event Browser with the Alarm Priority Field

Rename the \FF\VISION\FILES\EVENT.LOG before using the 2.3 Event Browser.

If you do not delete this event log, your Event Browser might trap when trying to read the event log file with the additional information in the message.

Alarm Management Shutdown Can Be Restricted

Exiting from the Alarm Management Service (AMS) can be restricted. A new checkbox, "Exit Alarm Management", has been added to both the Service Access and User Access under the Administration menu. By default, "Exit Alarm Management" is not restricted so that users can exit from the Alarm Management Service.

Instructions for Restricting Alarm Management Shutdown

The system administrator can impose restrictions on exiting from the Alarm Management Service(AMS) by checking the box in Service Access. As always, once the "Exit Alarm Management" is restricted, the system administrator will have grant users the right to exit AMS through the User Access service.

Environment Variable to Turn Off Blinking Title Bar

There is an environment variable, "title_bar_blink_on_alarm", that can be added to \FF\VISION\FILES\VCONFIG to turn off/on the blinking title bar when an alarm is triggered. The default is to have the title bar blink. To disable the blinking, enter the following in VCONFIG.

title_bar_blink_on_alarm: 0

I/O Subsystem

I/O Overrun Warning Default Changed to Enabled

Through the Data Monitor service, the initial state of I/O overrun warning messages has been changed to enabled.

Instructions for Modifying I/O Overrun Warnings

Through Data Monitor, the initial state of I/O overrun warnings can be changed to disabled. When PlantWorks is restarted, the last state that the user specified will be saved and will be the new initial state for logging I/O overrun messages.

When a user either enables or disables the I/O overrun messages, the new state will be logged to the event log.

Buildtime I/O Definition Default Settings Created

For I/O arrays, packets, and stand-alone points there are now default settings. The settings are region, data type, symbolic/logical address and address. These default settings allow users to quickly view a list of arrays, packets, or stand-alone points with the corresponding values for each of the default setting columns. The values are displayed after arrays, packets, and stand-alone points are created for I/O point sets.

NOTE: These default settings can be changed through the I/O Definition "Defaults" action bar option under the "Display Settings".

Buildtime I/O Definition Has New Runtime Monitor Session Field

When creating a point set through I/O Definition, the point set connection under "Alarms" has a new field for the Runtime Monitor(RTM) session. The RTM session number can be from 0 to 4. If the RTM session number is zero(0), the I/O alarms are routed to all RTM sessions. To select a specific RTM session, valid entries are 1 through 4.

For additional information, refer to the section in this document about enhancements to Runtime Monitor.

LDITs Supported on DAE-only Remote Nodes

For users who want to have PlantWorks communicate with devices on DAE-only nodes, the LDIT point set type has been enhanced to support this option. For example, if you have a Communications System/6000 node that communicates with a device using an LDIT, you can now communicate from PlantWorks to that device.

Prerequisite DAE Software

You must request modification number PN82921 from DAE support for the DAE platform where your LDIT will run. The DAE Device Data Management Support(DDMS) required modifications to support this PlantWorks enhancement.

Instructions for Communicating with LDITs on DAE-only Remote Nodes

1. Configure the DAE-only node to communicate with Communications System/2 on the PlantWorks node where the point set will be installed.
2. Configure the Device Data Management Support(DDMS) server ACB, CS2DMR00.CS2NODE, to be "load at initialization" on the DAE-only node.
3. Add the new environment variable, REMOTE_LDITS, and set it to 1 in the VCONFIG file found in \FF\VISION\FILES directory.

   NOTE: The environment variable, FF_DDMS_NODE, that was available in PlantWorks 2.2 cannot be used in combination with REMOTE_LDITS. If you attempt to use them both, you will get an error in your warning log.

   If you want all of your I/O to be one(1) DAE-only node, then use FF_DDMS_NODE. If you want PlantWorks to use multiple DAE-only nodes with the LDIT point set type, then use the REMOTE_LDITS indicator.
4. Through the Buildtime I/O Definition, modify the point set that has the point set type as "LDIT". Press the "Define" push button and have the registration name of the LDIT ACB field match the node name of the DAE-only node where the LDIT is executing.

   For example, if the DAE node name is REMOTEA and the LDIT is MYLDIT, the LDIT ACB name field, should be MYLDIT.REMOTEA. All I/O requests for that point set will then be sent to DAE Device Data Management Server(DDMS) running on the DAE node, REMOTEA.

If you have LDIT point sets that communicate with devices on your PlantWorks node, verify that the registration name for the LDIT ACB is CS2NODE or the CS/2 node name you specified when configuring PlantWorks.

Shutdown Information about PW and LDITs on DAE-only Remote Nodes

Because the I/O on DAE-only nodes is not managed directly by PlantWorks, when PlantWorks is shut down, the DAE-only nodes must also be shut down.

If the DAE-only nodes are not shut down to clean up the DDMS environment, you will get errors in your PlantWorks warning log when trying to re-establish communications with the devices on the DAE-only nodes.

Modifying Point Set from "LDIT" to "Test" Mode on DAE-only Remote Nodes

If you modify a point set connection "mode" from LDIT to TEST, you must follow the same instructions as the section above, "Shutdown Information about PW and LDITs on DAE-only Remote Nodes". As explained above, because the DAE-only nodes are not managed directly by PlantWorks, you must make the change and shutdown the PlantWorks node(s) and the DAE-only node(s).

If the DAE-only nodes are not shut down to clean up the DDMS environment, you will get errors in your PlantWorks warning log when trying to uninstall the devices on the DAE-only nodes.

Handling Failures When PlantWorks Starts

As with any PlantWorks user application that communicates with devices, you need to provide logic in your user application to handle scenarios when the initial install of point set(s) fails.

Your application will have to have logic to determine the cause of the failure and the corrective action(s) to be taken. For example, if a device is unplugged on a DAE-only node, you will get a failure on the install of the point set when PlantWorks is initialized. Your application will need to handle appropriate corrective action to reinstall or reconnect the device. The user application should provide logic also to detect when a DAE-only node is down. These examples are not an exhaustive list, but only a few of the startup failures to consider.

Security - External Security APIs

The PlantWorks External Security APIs give you the ability to login and logout PlantWorks users from your own C programs. Two APIs have been provided. There is also a sample C program in the \FF\SAMPLES\PWEXTSEC directory.

PWLogin and PWLogout APIs

PWLogin - Login a PlantWorks user

Format:

```
#include  <pwextsec.h>
#include  <lio_msg.h>
 int PWLogin(char  username, char  password);
```

Description:: PWLogin attempts to login the given username with the given password. If the login is successful, the Runtime Monitor and the Service Control Window will both be updated with the new login information and security level. If the login fails, PWLogin returns one of the error codes define in lio_msg.h.

The username and password character strings should be null terminated strings that are 9 characters in length (8 characters + 1 NULL character). The PWLogin function is case sensitive. PlantWorks only accepts upper case USERNAMEs and PASSWORDS, so you must supply upper case strings.

Return Codes:

0 Login was successful

E_NO_USER The username is not defined in PlantWorks

E_PASSWORD
The password is invalid

E_LOGIN_SESSION
A user other than the default use is logged on. You must first logout.

For detailed explanations of these return codes, type

```
help  lioxxx
```

where xxx is the number corresponding to the return code listed in the lio_msg.h file. You must do this in a PlantWorks Windowed or Full-Screen environment.

PWLogout - Logout the current PlantWorks user

Format:

```
#include  <pwextsec.h>
#include  <lio_msg.h>
 int PWLogout(int reserved);
```

Description:: PWLogout will logout the current PlantWorks user. If a default user is specified in Network definition, that user will then be logged in. If any restricted access PlantWorks applications are running, they will automatically be shutdown during the logout.

Note: The **reserved** parameter is currently ignored and is reserved for future enhancements.

Return Codes:

0	Logout was successful