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README: OptoDisplay

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Maximize the Notepad window to read this file more easily.

Please review the following FactoryFloor topic page for information about FactoryFloor software and firmware updates and patches:

<http://www.opto22.com/lp/factoryfloor.aspx>

Please review and install this separate DLL patch that affects OptoDisplay:

[http://www.opto22.com/site/knowledgebase/kb\\_view\\_article.aspx?aid=1203](http://www.opto22.com/site/knowledgebase/kb_view_article.aspx?aid=1203)

[http://www.opto22.com/site/downloads/dl\\_drilldown.aspx?aid=3535](http://www.opto22.com/site/downloads/dl_drilldown.aspx?aid=3535)

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OptoDisplay B4.1h Patch

June 28, 2010

This OptoDisplay patch requires that OptoDisplay 4.1 already be installed. Do not install this patch unless OptoDisplay 4.1 is already installed.

Installing the Patch

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Follow these steps to update an earlier version of OptoDisplay 4.1 to the current version in this patch:

1. Stop the OptoDispLS service.
  - a. Choose Start > Control Panel > Administrative Tools > Services.
  - b. Early versions of the install added the service under an incorrect name. If you can't locate OptoDispLS in the services applet, look for a name similar to this:
    - i. "FACFL~|VersionManager"
    - ii. The description might say "OptoSnif".
  - c. Stop the service.
2. Back up the C:\Windows\system32\OptoDispLS.exe file.
3. Replace OptoDispLS.exe with the one in the zip file.
4. Start the service from the services applet.
5. Back up the current OptoDisplay executable files (which are normally located in a folder similar to C:\Program Files\Opto22\FactoryFloor 4.1\):
  - a. OptoDisC.exe
  - b. OptoDisR.exe
  - c. OptoDsRX.exe
6. Replace each file with the ones in the zip file.
7. Update your project
  - a. Start OptoDisplay Configurator.
  - b. Open your project.
  - c. Save your project.
8. Go to Runtime.

Bug fixes:

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- B4.1h (9/4/09)

Runtime:

Fixed memory leak.

- B4.1d (4/20/07)

Configurator:

KB57143 - The Browse... button for the Remote Computer, under Remote SuperTrend logging, was not showing the entire network, only the root entry.

- B4.1c

Runtime:

Corrected calculation errors for displaying a Trend with no labels.

- B4.1b

Runtime:

- \* Fixed random crash related to displaying metafile images.
- \* New OptoDispLS security service. It no longer requires administrative privileges to launch Runtime.
- \* Added Pointer support to OptoDisplay scanner.
- \* Fixed a bug that could cause a crash (related to checking the configured security for an output dynamic attribute when the window file was being read.)
- \* Fixed a bug with alarm sounds not sounding if an alarm point re-appeared in an alarmed state.

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What's New in version R4.1a?

January 17, 2005

New Features and Enhancements:

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- \* Added multiple security features so you can:

- Configure the Operator Driven dynamic attributes of an on-screen object to restrict HMI use to operators who are defined in Microsoft® Windows® User- and Group-level security settings.

- Encrypt the Runtime Operator Action Log file to provide a secure record of operator activity.

- Have the project's version number increase automatically whenever a project is modified.

The new access control capabilities, plus new operator log encryption, can be useful for organizations which must meet U.S. FDA 21 CFR Part 11 requirements.

- \* Added a new color version of the Symbol Factory library of industrial graphics.

- \* Symbol Factory graphics can now be dragged and dropped directly into an

OptoDisplay project.

- \* Graphics in JPEG file format can be imported into an OptoDisplay project.
- \* A new on-screen object has been added that can hold up to four numeric tables from an OptoControl strategy.
- \* OptoControl pointer variables and integer 64 values can now be used in an OptoDisplay project.
- \* Added an Alarm Point Persistence feature that lets you specify how long an alarm condition must be present before an alarm is triggered.
- \* Added Automatic Re-alarmed after Acknowledge feature that triggers the alarm if the trigger condition remains for a set period of time after the alarm is acknowledged.
- \* New "silenced" color for Alarm Point graphics visually indicates alarms that have been silenced and not acknowledged.
- \* Runtime Logs are now in the same format as OptoDisplay historic logs. Custom headers can be used in a Runtime log file.
- \* A single Controller status object can now display the status of several controllers.
- \* Multiple improvements in project authoring environment so you can:
  - Search and reveal tags used in projects.
  - View just the tags configured for an object.
  - View individual Dynamic Attributes for an object.
  - Format the text read from a controller as decimal, hexadecimal, binary, or exponential.

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What's New in version R4.0e?  
April 14, 2003

Bug fixes:  
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Configurator:

- \* The Replace feature in Configurator no longer allows trying to modify a bit value greater than 31 in an Integer32 variable type. It does allow modifying bits greater than 31 in Integer64 variables.
- \* The View Dynamic Attributes now correctly shows recipe and Execute Menu Item dynamic attributes.
- \* A bug where the Project Password dialog would sometimes fail even when the correct password was entered has been fixed.
- \* GDI resource leaks with fonts and metafiles have been fixed.

Runtime:

- \* Syncing the PC time and controller time now works correctly.

- \* A problem where Runtime would hang during rollovers of log files has now been fixed.
- \* Sending both a discrete and a value no longer gives an error message.

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What's New in version R4.0d?  
April 9, 2002

Bug fixes:  
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- \* Problems with Configurator consuming too many GDI resources has been fixed.

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What's New in version R4.0c?  
March 26, 2002

Bug fixes:  
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- \* Configurator displayed text improperly on some Windows 2000 systems. This has been corrected.
- \* When triggering multiple Operator Driven Dynamic attributes in Runtime, the "TValue Error" message is no longer generated.
- \* In Runtime, pressing the ENTER key when the Event Log window was active closed the window until the Runtime application was closed and restarted. This has been corrected.

Enhancements:  
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- \* OptoDisplay Runtime Event Log now displays the "Controller Locked" error message.
- \* Better metafile checking has been added to Configurator to reduce invalid metafiles from being imported into the project.

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What's New in version R4.0b?  
February 08, 2002

Bug fixes:  
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- \* Sending Discrete values to bits 0 through 31 of Integer64 types now works correctly in Runtime.
- \* Metafiles now properly paste after being copied.
- \* Operator Logging no longer crashes.

- \* Operator Logging now writes the file to the correct location.
- \* Repeatedly sending discrete values no longer locks the controller.

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What's New in version R4.0a?  
January 15, 2002

New Features:  
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- \* Operator runtime logging allows all actions and modifications resulting from Operator Driven Dynamic Attributes to be logged to a file. Actions that can be logged include changing process values or discrete items, downloading or uploading recipes, launching applications, running menu commands, and detaching or attaching controllers. Modifications to alarm point values can also be logged.
- \* Scanner Information File -- A scanner information file is a text file that contains diagnostic information that can be useful in debugging throughput problems with the OptoDisplay scanner. The file lists information about the scan groups, refresh groups, and tags that are being scanned by the configured controllers. Opto 22 Product Support can also use this file to help resolve scanner throughput problems.
- \* Runtime can now be configured to not display the Exit dialog when closing.

Updated:  
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- \* The OptoDsrX version of Runtime now has the View->Controllers menu option available.

Bug fixes:  
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- \* Label text in Configurator now displays correctly under Windows 2000.
- \* Selecting integer and float table ranges when configuring tags is only allowed if configuring an XY Plot or Historic Data Log points.
- \* The option "Play sound continuously" now works correctly when using alarm points that are not inserted into an alarm graphic.
- \* Deadbands for floats now work when configuring "Text In From Controller" Dynamic Attributes.
- \* The "Switch Controllers" menu option now appears correctly in Runtime.

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What's New in Version R3.1e?  
March 23, 2001

Updated:

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- \* The XY Plot Configuration dialog box now lets you easily enable or disable individual plots in an XY plot graphic object.

Bug fixes

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- \* The XY Plot Configuration dialog box now correctly enforces the limit of 50 table elements for each individual plot in an XY plot graphic object.
  - \* Help buttons on the Runtime Configuration dialog and the Refresh Groups Configuration dialog now work correctly.
  - \* OptoDisplay Runtime now works correctly if both "Enable Synchronization at Runtime Startup" and "Enable Auto Synchronization" options are selected in OptoDisplay Configurator's Configure Runtime dialog box.
  - \* Metafile (WMF) graphics now display correctly in Windows 2000.
  - \* Importing a symbol that is associated with a controller into a project that has no configured controllers no longer causes OptoDisplay Configurator to crash.

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What's New in Version R3.1d?  
February 15, 2001

New Features:

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- \* An XY Plot graphic has been added. Up to 6 separate pens can be displayed per graphic.
  - \* If the identical OptoControl strategy is running on more than one controller, OptoDisplay now offers the ability to have a window switch controllers and begin viewing data from a different controller.
  - \* Added support for SNAP-ENET-D64 digital only brain. Can read, clear, set, or toggle discrete bits in 64-bit integers. (64-bit integer values and tables are not supported)
  - \* A report displaying all configured dynamic attributes for any or all windows in a project, along with all configured Alarm Points may be generated.
  - \* Controllers may be synched to PC's time and date manually, based on a user-defined schedule, or each time Runtime starts.
  - \* The number of Refresh Groups has been increased to 14.
  - \* Graphics may now be locked to their window position.
  - \* Graphics displaying controller tag data may be configured to indicate invalid data by changing to a user-selected Detached On Error or Detached By User color if the controller goes off-line .

- \* Added Discrete Acknowledge color to the Alarm Point Controller-Driven dynamic attribute.
- \* Background color for fill style may be chosen.

Bug Fixes:

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- \* Multiple sounds configured for alarms and triggers are now played sequentially.
- \* Printing a window that spans multiple monitors now works correctly.
- \* Historic log names are now properly displayed in the Configure Historic Log Point dialog.

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What's New in Version R3.1b?  
June 16, 2000

Bug Fixes:

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Configurator:

- \* Clearing a dynamic attribute from a graphic with a fill color, would revert the graphic to white;
- \* The Window Properties dialog would sometimes disable the "Open when there are new alarms" and "Disable close if there are active alarms" checkboxes when the window contained alarms.
- \* Memory leaks in the Tag Selection Dialog were corrected.
- \* Clicking Cancel from the Edit Dynamic Attributes dialog no longer causes a graphic to lose it's fill color and revert to white.
- \* When Configuring AlarmPoints, the HiHi and Hi priorities are not reset to 0 when the dialog is displayed.

Note: the actual priorities in OptoDisplay Runtime were not affected. Only the dialog in Configurator showed the incorrect values.

Runtime:

- \* Release R3.1a may cause scanning speed to be slower than previous versions. R3.1b corrects this problem.
- \* When opening a password-protected window, user now has three opportunities to enter the correct password;
- \* In Discrete Alarms, if the sound was set to "Play sound continuously until any alarm is acknowldeged", the sound was never played for new alarms after the first

acknowledgement;

- \* When configuring the "Acknowledge" notification for alarmpoints, if bit indexes were used with the Discrete->Set option, a "Data Range Error" would appear in the event log window;
- \* Memory leaks with Trends were corrected;
- \* When configuring AlarmPoints, if the Conditional tag was set to discrete, and no Bit Index was entered in the Tag Selection dialog, the condition was never met.
- \* The window password dialog now masks the password.

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What's New in Version R3.1a?  
February 29, 2000

New Features:

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- \* "Alarm Point" controller driven attribute allows graphics to change color and blink based on the status of an alarm point. Colors are user-configurable.
- \* Controller status may now be configured as an alarm point.
- \* "Controller Status" controller driven attribute allows graphics to change color based on the status of controllers. Colors are user-configurable.
- \* "View Controller Status" operator driven attribute launches Runtime's Controller Status dialog for a configured controller. Allows manual detaching/re-attaching of controller. (See following item)
- \* In Runtime's Controller Status dialog, controllers may now be detached manually. The scanner will not attempt to re-attach to the controller until the Attach button is clicked.
- \* An Alarm Clear notification has been added to alarm point configuration.
- \* Individual windows can be protected with a password.
- \* The entire OptoDisplay project can be protected with a password.
- \* A monitor-only version of Runtime (OptoDsrX.exe) is provided that disables all operator driven attributes except opening/closing windows. Only the File and Help menus are available in this version of Runtime.

Enhancements:

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- \* Runtime no longer uses 100% CPU time.

- \* Added links in the Help menu to manuals and Opto 22 Web sites.
- \* When no project is loaded, a shortened menu is displayed.

Bug Fixes:

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- \* Configurator no longer crashes when you try to modify a Launch Application attribute.
- \* A problem displaying metafiles in Runtime has been fixed. This problem was due to a bug in Windows 95, Windows 98, and Windows NT SP 4 that caused system resources to be exhausted, resulting in Runtime hanging or crashing.
- \* Integer tables now appear correctly when configuring the Visibility blink attribute.
- \* When opening an OptoDisplay version 2.2 project in OptoDisplay 3.0, configured historic logs now appear correctly in the Configure Historic Log File list box.
- \* SuperTrend historic files containing header lines longer than 80 characters (up to 255 characters) now display correctly.
- \* SuperTrend remote logging now works under Windows 95 and Windows 98. Previously, each computer thought it was the computer saving the data, regardless of which computer was configured to do so.
- \* Memory is no longer continuously allocated to basic trends or SuperTrends. This caused all available memory to be consumed.
- \* If started without a project, Runtime no longer crashes when the Windows "Date/Time Properties" dialog box is closed by clicking OK.
- \* Runtime no longer crashes if hot-keys no longer activate valid dynamic attributes.
- \* The "Acknowledge All" button now works correctly for Summary and Detailed alarms.

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What's New in Version R3.0b?  
September 28, 1999

Bug Fixes:

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- \* Integer and float tables now appear in the Tag Selection dialog box.
- \* Ctrl+Z and Ctrl+Y key combinations now work for Undo and Redo.
- \* Lines no longer move or rotate when closing the Dynamic Attributes dialog box.
- \* Lines no longer move when dragging the origin of a line to resize it.
- \* In the Value tab of the Alarm Point dialog box (Configure->Alarm Points, double-click an alarm point, click the Value tab), if a

LoLo value is configured to use a tag, the "Tag" option remains selected after closing and reopening the dialog box. Previously, the "Value" option would become the default.

- \* In the Alarm Notification and Acknowledge Notification dialog boxes (Configure->Alarm Points, double-click an alarm point, click Alarm or Acknowledge), the "Current Value" option in the Setup By field remains selected after closing and reopening the dialog box. Previously, the "Discrete" option would become the default.
- \* SuperTrend log files saved to locations other than the project directory now appear in the Select Log File list.
- \* A graphic placed over an imported metafile graphic object can now be moved without having other graphics placed over the metafile graphic disappear.
- \* Static text no longer disappears when dynamic text is placed over it.
- \* The keyboard can now be used to select menu commands when SuperTrends appear in OptoDisplay windows.
- \* More than 48 SuperTrend objects can have the "Keep File Open" option selected at the same time. Previously, if more than 48 SuperTrend objects had this option selected, a "Disk Full" error would occur in Runtime after 3-5 minutes.
- \* Integer and Integer tables have been re-added to the Discrete Tag Type dialog box.
- \* The Z-order option now appears in the Context menu when you right-click a group that is made up of grouped objects.
- \* The "Refresh Time" option in the Tag Selection dialog box now correctly shows changes made to the value after the first time it's been set.
- \* In the Window Properties dialog box (Window->Properties), the "Always in memory" checkbox now remains selected if an alarm is not in the window.
- \* Projects can now be opened by double-clicking the icon in Windows Explorer if the "Reload last project at startup" checkbox is selected in the Configurator Options dialog box (File->Configurator Options).
- \* Configurator no longer quits unexpectedly when alarm points are being configured.
- \* Configurator no longer behaves strangely when trying to set up controllers and strategies.

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What's New in Version R3.0a?  
July 14, 1999

New Features:  
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- \* 50 levels of Undo in Configurator.
- \* Symbol Factory: A library of 3,000 graphics designed for industrial automation.
- \* SuperTrends: Remote Logging - collect and/or save SuperTrend data on a remote computer.
- \* Alarms: Alarm Points may be conditionally enabled based on controller tag value.

- \* Alarms: Alarm Point level values may be set by controller tag values.
- \* Alarms: Option to adjust enabling/level values/priorities in Runtime.
- \* Support for Windows Metafiles (.wmf) and Enhanced Metafiles (.emf).
- \* Launch Runtime from Configurator with current project.
- \* STRNDCVT: A utility for converting binary SuperTrend data to ASCII text for viewing. Includes source code.

#### Enhancements:

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- \* SuperTrends: Data may be stored in ASCII or binary format.
- \* SuperTrends: Y-axis grid may be displayed in active pen color.
- \* Alarms: Option to reload history alarm window data at startup.
- \* Alarms: Alarm columns may be dynamically sorted and moved in Runtime.
- \* Alarms: The Configure Alarm Points dialog now displays a reference count for each alarm point, indicating how many alarm windows the point appears in.
- \* Historic Data Logs: Allows user-selected name for tag.
- \* Improved drawing and sizing functions.
- \* Customizable date format for data log files, alarms, and SuperTrends.
- \* Option to clear Forth words from controller at Runtime startup added.
- \* Option to reload last Configurator project at startup added.
- \* Many dialogs now remember their size and position.

#### Bug Fixes:

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- \* Alarms: If a window contains alarms, the "Always in memory" checkbox is checked, and may not be unchecked.
- \* Menu hotkeys are now unique.
- \* Menu options are now context sensitive.
- \* Available disk space now checked before saving a project to a different location.
- \* Current window now remains on top after executing Window->Properties from main menu.
- \* If files are missing from a project, a list of missing files is presented, and the project will not load.

- \* When bitmaps are removed from windows, they are now also removed from the project file.

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What's New in Version R2.2b?  
October 1, 1998

Bug Fixes:  
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- \* SuperTrends: A memory leak caused when opening and closing a window containing a SuperTrend has been fixed.
- \* SuperTrends: Problems with graphic labels interfering with a SuperTrend have been fixed.
- \* Printing: A memory leak when printing has been fixed.

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What's New in Version R2.2a?  
June 15, 1998

New Features:  
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- \* SuperTrend: A combined real-time and historical trend.

Enhancements:  
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- \* Integer-bit scanning: The scanning of integer bits has been substantially improved.
- \* Scanner Overruns: The "Scanner Overrun Error" message has been changed to "Scanner Overrun Notification".

Bug Fixes:  
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- \* Alarms: AutoCorrect Tags now works with Alarms.
- \* Alarms: Alarm comments can now be longer than 50 characters.
- \* Alarms: Problems with choosing the log file's location have been fixed.
- \* Copy Window: Canceling a Copy Window command no longer causes a crash.

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What's New in Version R2.1a?  
October 2, 1997

New Features:  
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- \* Tag Search & Replace: A new tool to facilitate changing tags in

graphics.

- \* Controller verify: When pasting graphics (from another project or symbol file), the controller in each tag is now verified to exist in the new project.
- \* Color Palette: Colors in the palette dialog can now be customized.
- \* TrueType Fonts: Text can now use any installed TrueType font

Enhancements:

- \* Alarm Logging: Alarm log files now have an extension of ".ALM"
- \* Recipes: Recipes can now use long filenames.

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What's New in Version R2.0f?  
September 25, 1997

Enhancements:

- \* Time Changes: The Runtime now supports changes to the clock. If the time changes while the Runtime is running, there will be no interruption in scanning.

Note: When the time is changed, all data in all trends will be reset. Also, if the time is set back, historic and event logs will continue to use the current log file and will roll-over at the next configured time. This will preserve the order in which data was received, but can result in data appearing to be in the wrong log file.

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What's New in Version R2.0e?  
August 21, 1997

Bug Fixes:

- \* Alarming Sounds: The "Play sound once when new alarm" option in the Alarming Setup dialog would cause the Runtime to shut down improperly. This would prevent any Opto 22 software from loading and could only be fixed by rebooting the computer.
- \* Historic Logs: OptoDisplay R2.0b introduced a bug that would cause quoted strings to be invalid.

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What's New in Version R2.0c?  
June 20, 1997

- \* Hot Keys: Graphics can now have an associated key. This removes the requirement that a mouse be used in the Runtime. There is an

addendum in the Configurator's help file that explains this new feature.

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What's New in Version R2.0b?  
June 9, 1997

- \* Alarming: OptoDisplay now has alarming functionality. There is an addendum in the Configurator's help file that explains the new features.

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What's New in Version B1.2a?  
March 7, 1997

- \* Networking: Instead of using NetBios communications to OptoMds, This version of OptoDisplay uses RPC communications to OptoCds. The advantage of RPC over NetBios is better reliability, easier network setup and better throughput. If using OptoDisplay-to-OptoCds network support, you'll need to install OptoServer. Use of RPC instead of NetBios solves problems such as:
  - \* determining correct 'LANA' numbers
  - \* inability to work while other network protocols are used.
- \* Leaks: This version fixes some memory leaks.
- \* Backup controllers: now a backup controller can be specified and it doesn't matter if the controllers are local or server-based controllers.
- \* New compiler: This version is compiled with the newer Borland 5.01 compiler instead of 4.52. Newer Borland DLLs are required. These DLLs are cw3220.dll, mbds50f.dll & mowl50f.dll.

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What's New in Version R1.1?

Contents:

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What's New in Win32  
New Features, Enhancements and Bug Fixes  
Windows NT Installation Notes  
Troubleshooting Communication Problems  
Uninstallation of this Product  
How to Get Help

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What's New in Win32:

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If you are a user of the Mystic MMI and you are going to be converting a project created with that product, the only requirement is that the controllers be registered before running the OptoDisplay Runtime.

Refer to the "Controller Configuration" section of your user's manual for detailed information about how to make the appropriate changes.

OptoDisplay does not require that the project file reside in a directory with the same name as the project file itself. To open a project, select File->Open Project and choose the .MMI file from the Open Project dialog. When saving the project, a new directory is NOT created. The project file is written into the directory selected in the Save As dialog (File->Save Project As command) or in the New Project dialog (File->New Project command).

OptoDisplay will continue to function with .GML/Cyrano type strategies. The controllers must have the Mystic Kernel firmware (i.e., the DOS/Win16 based kernel). If you converted your strategy to a .CDB/OptoControl strategy, you must update your OptoDisplay project to use the new strategy. Additionally, the controller must have the OptoKernel firmware (i.e., the Win32 based kernel). To change to the converted strategy, use the "Configure->Controllers" dialog in the OptoDisplay Configurator. This dialog lists all the controllers configured for the open project. For each of the controllers that had their strategies converted, select the controller and press the Modify button. The resulting dialog is the Controller Properties dialog. Use the Strategy->Browse button to locate the converted strategy. You will get a warning message indicating potential problems which result from selecting the wrong strategy. Once all the controllers have been updated, use the Tool->AutoCorrect Tags command to synchronise OptoDisplay and OptoControl tags. See below for a description of this new feature.

The "Tools" menu option was changed to "Tool". The drawing tools were removed from this menu. They are only accessible via the Toolbox. Under the "Tool" menu there is a feature that can be used to AutoCorrect Tags in the project. It will synchronize OptoDisplay tags with those from the strategy. There are a few cases in which the OptoDisplay tags cannot be corrected. These include tags that have been deleted from the strategy and tags that index tables out of bounds. In these cases, the user is given an appropriate message. The user must manually correct these tags.

Sound files can reside in any directory. They can optionally reside in the project directory.

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#### New Features, Enhancements and Bug Fixes:

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Since Version R1.0f:

#### New Features:

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none

#### Enhancements:

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The memory management for the trends was improved significantly. This was critical for trends with a fast sample rate, and a long time span.

Bug Fixes:

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The list of PopWindows was getting reversed everytime a project was saved or when the PopWindow dialog was opened.

Fixed Send Discrete dialog to allow the enabling of an I/O Unit.

Can now use A:\ as the destination directory for a recipe upload

Could not handle closing the window that was in the middle of processing a graphic dynamic attribute (e.g., prompting for a recipe file).

When changing the tag for a graphic's dynamic attributes, the tag selection dialog would reset the refresh group to zero.

Fixed initial open window process in runtime so that closed windows don't show themselves.

Made choosing graphics easier allowing for 2 pixel miss.

Now put up a message if a draw windows doesn't exist.

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Windows NT Installation Notes:

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Windows NT users must have write access to the registry and the Windows\System directory to successfully install and use this product.

Windows NT users must reboot after installation and after each configuration/modification of communication ports.

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Troubleshooting Communication Problems:

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If you are a Windows NT user and are experiencing communication problems which are indicated by the following errors, first try re-booting your machine to ensure that all port configurations have been correctly registered with the operating system.

"Invalid port error. WinRT drivers might not have started."

"Invalid protocol error."

"Port setup invalid."

"Could not find other nodes in ARCNET."

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Uninstalling this Software:

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A utility is provided to uninstall this software. The utility will remove all registry entries and files previously installed.

Exceptions are:

- Previously configured controllers are not removed from the registry.
- The installation directory tree is not removed if any user-created files exist in it.
- The Win95 program folder or Windows NT program group is not removed if any icons have been added by the user.

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#### How to Get Help

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If you have any questions about this product, contact Opto 22 Product Support Monday through Friday, 8 a.m. to 5 p.m., Pacific Time.

E-mail: support@opto22.com

Phone: 800/TEK-OPTO (835-6786)  
909/695-3080

Fax: 909/695-3017

Bulletin Board (BBS):  
<http://bbs.opto22.com>  
909/695-1367  
(24 hours a day, 7 days a week)

When accessing the BBS, use the following modem settings:

- No parity, 8 data bits, 1 stop bit
- Baud rates up to 28,800
- Z-modem protocol for uploads and downloads

Please provide the following information about your system to the Product Support engineer:

- Version of this product
- PC configuration (type of processor, speed, memory, operating system)
- A complete description of your hardware system, including:
  - jumper configuration
  - accessories installed (such as daughter cards)
  - type of power supply
  - types of I/O units installed
  - third-party devices installed (e.g., barcode readers)
- Controller firmware version
- Any specific error messages seen