

README.TXT

Release Notes for EPSON RC+
Version 4.1.4

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Installation Notes

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1. EPSON RC+ 4.1.4 must be installed on Windows 2000 Professional with Service Pack 4.

Windows NT 4.0 is supported in versions prior to 3.5.0.

2. If you are upgrading, please refer to the upgrade notes found later in this file.
3. You must be logged in as Administrator to install.
4. To install:
 - a. Insert the EPSON RC+ installation CD.
 - b. The setup program will start automatically.
 - c. If setup doesn't start, run e:\EpsonRC\setup.exe where e: is the CD drive.
 - d. Follow the instructions on the screen.
5. When you reboot the system for the first time after installation, you must use the same login name that you used for installation. This is so that system files are updated properly.
6. In order run SPEL programs, you must install the SPEL Runtime Drivers. This is specified during installation.
7. To use EPSON RC+ on a PC that will not be running a robot, such as a laptop, do not install the SPEL Runtime Drivers option.
8. To use Vision Guide without a frame grabber, select VGA mode.
9. You can install EPSON RC+ on the same system where SPEL for Windows v1.xx or v2.xx is installed. The EPSON RC+ installation creates a new Windows program group and no files are shared with v1.xx or v2.xx versions.
10. When using the VB Guide option, you must install Visual Studio 6.0 Service Pack 4 or greater.

Getting Started

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After installation, there will be a program group called

"EPSON RC+". A desktop shortcut is also created.

To start EPSON RC+, either double click the desktop shortcut or click Start, then select EPSON RC+ from the EPSON RC+ program group.

The very first time you run EPSON RC+, no projects will be open. You must create a new project by selecting New Project from the Project menu. By default, the next time you run EPSON RC+, the last project you were working on will be opened automatically.

Getting Help

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EPSON RC+ has context sensitive help. Press the F1 key at any time to get help for the current operation, or click on the HELP button for the current dialog box, if available. You can get help for SPEL+ language keywords in the Edit window by placing the insertion point anywhere within a keyword and pressing the F1 key.

You can also select Contents from the Help menu to open the Help table of contents. First time users should review the Introduction in the help contents.

Upgrade Notes

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EPSON RC+ Users:

1. You may install a newer version of EPSON RC+ without uninstalling the previous version. This is recommended because the upgrade software will know which options were previously installed and your system configuration will be preserved.

For EPSON RC+ version prior to 4.0.0, you must first upgrade Windows NT 4.0 to Windows 2000 Professional before upgrading.

- a. Refer to step 2 below and execute a MKVER.
 - b. Upgrade to Windows 2000.
 - 1) Boot Windows NT.
 - 2) Insert the Windows 2000 CD.
 - 3) When asked if you want to upgrade the current version of Windows, say Yes.
 - 4) The Windows 2000 installation will preserve the registry and previous applications.
 - c. Install Windows 2000 Service Pack 4.
2. Execute MKVER before upgrading to save your system configuration. Select Tools | Maintenance, then click MKVER. Enter a name and save it to floppy. If you decide to uninstall the previous version of EPSON RC+, the robot setup information will be removed. After installing the new version, you can use SETVER from Tools | Maintenance to restore the system configuration.

3. Before you start installing the new version, ensure that the SPEL Runtime Drivers are shutdown. If you see the robot icon in your Windows system tray, then right click on the icon and select Shutdown SPEL Drivers. If you attempt to install when the drivers are running, you will receive a message to shutdown the drivers before you can proceed. In this case, you will have to start the setup program again by re-inserting the CD or double clicking on the CD icon in My Computer.
4. If you are upgrading Vision Guide, the RC+ installer will first uninstall the previous vision drivers, then reboot the system. After reboot, installation will continue.

Revision List v4.1.4
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What's Fixed in v4.1.4:

1. Fixed problem for multiple Sony HR70 cameras in progressive scan mode. A Y shift of an acquired image could occur. To correct the problem, please use the hr70c1 camera interface.
2. Fixed problems for VCreateSequence and VDeleteSequence when VSaveProps was not being called. Errors would occur if the Vision Guide window was opened after running.
3. The Sentinal hardlocks will now work again.
4. Fixed a problem where if a camera was disconnected, live video could no longer be displayed.
5. The EdgeType property is now copied when an Edge object is copied.
6. Fixed a problem for Japanese descriptions in I/O labels and User Errors. Sometimes the text was being chopped or RC+ was crashing.
7. Fixed a problem where the bottom of the video image was sometimes black when using cameras in async reset mode.
8. Fixed VSet for ExposureTime.
9. Fixed a problem where errors were occurring if a vision sequence that used a robot camera was being run in offline mode.
10. Fixed a problem where RC+ did not reset all ISA outputs if the port size was 16 and the number of ports / board was greater than 2.
11. Fixed error 91 which occurred when the Operator Window was closed and there was no vision system.

12. Fixed a problem where a duplicate image could sometimes occur when a Sony HR70 camera was being used in async reset mode. To correct the problem, please use the hr70a1 camera interface.

13. Fixed SPELVideo control. Video was not being displayed in v4.1.3.

Revision List v4.1.3

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What's New in 4.1.3:

1. Added several new barcodes for Vision Guide Code Reader.
2. SPELCom RunDialog can now show the Force Monitor dialog.
3. New LJM Command. The LJM command instructs the controller to use the least joint motion to move to a point.

What's Fixed in v4.1.3:

1. Fixed divide by zero error when opening the Vision Guide window if the first object in the first sequence was a Point.
2. Remote bits greater than 96 can now be used.
3. Fixed problem for jog speed that could sometimes occur after freeing an axis and then locking it. The robot would jog at high jog speed even though it was set to low.
4. If a robot point had a description but no label, then when the file was opened, the label became the description.
5. Fixed problem for Error statement. If the error number parameter was a local variable and there was no local error handler, then the error was not sent to the calling function.
6. Fixed Edge X1, Y1, X2, Y2 becoming zero if the edge object was in a frame and the frame was not found.
7. Fixed Spelcom PortOpen when Spelcom objects are used in multiple processes. PortOpen was hanging on processes other than the first one.
8. ExposureTime is now copied when a sequence is copied.
9. Fixed GUI comm port timeout setting. After changing a timeout from Setup | System Configuration | Comm Ports, the value was being used as milliseconds by the system instead of seconds.
10. Fixed some Pro Six motion problems using Move. Sometimes J4 was not moving to the correct position and error 4250 was occurring.

Revision List v4.1.2 SP1

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What's New in v4.1.2:

1. UL 6-axis robots are now supported.

What's Fixed in v4.1.2 SP1:

1. Fixed hang condition that sometimes occurs when Fieldbus is used and estop is active.
2. Fixed EdgeType property for Edge object. If Polarity was changed to DarkOnLight, the EdgeType property was changed to Pair after the project is re-opened. Also, VSet can now be used with EdgeType.
3. Fixed variable corruption when negative array subscript is used. Now a "subscript out of range" error is generated.
4. Fixed timeout setting for TCP/IP. When timeout was set from Setup | Configuration | TCP/IP, the value was not saved properly.
5. Fixed Edge arrow size when high resolution camera is used.
6. Fixed the color for the current Edge result.
7. Fixed variable corruption problem when tasks were being started from a remote control device after being enabled from the Run Window and Quit was used.
8. Fixed edge detection operations for ImageOp.
9. Fixed problem with SetVer and OP Enabled. After executing SetVer, OP Enabled was restored correctly, but after closing and re-opening EPSON RC+, OP Enabled was unchecked.
10. Fixed problem for UBound. After Redim, UBound reports the declared upper bound, not the current upper bound.
11. Fixed VGet for EdgeType property of Edge object. Error 367 was occurring.
12. Fixed NumberToFind for Edge using a value of 0. Previously, an error occurred when NumberToFind was set to 0.
13. Fixed hang for program print out for long lines with no spaces or tabs, such as a comment line with dashes.

Revision List v4.1.2

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What's New in v4.1.2:

1. Ethernet/IP is now supported in the Fieldbus option.
2. Added support for Morphis frame grabber.
3. Pan and zoom have been added to the Vision Guide window.
4. Multiple edge results are now supported.

5. The edge tool can now also find edge pairs.
6. In VGA mode, you can now select the camera type, which allows the video resolution to match the camera.
7. Vision pictures are now automatically scaled to the video window.
8. "Don't care" pixels can now be defined for Correlation and Geometric models.
9. Added new SPEL Option: Safeguard open stops all tasks.
10. Jump, Jump3, Jump3CP commands have been improved for CP motion.
When these commands do not have depart upward motion, deceleration will
not occur after a previous PTP motion command if CP is ON.
When these commands do not have approach downward motion, deceleration
will not occur before a successive PTP motion command if CP is ON.

What's Fixed in v4.1.2:

1. Fixed memory corruption problem that sometimes occurred for Geometric tool.
2. Fixed Maintain Robot Parameters when used with robots that do not support Inertia settings.
3. Fixed error 2601 for MsgBox which occurred when parameters were omitted.
4. Fixed timeout that occurred when tasks were aborted during SavePoints, ImportPoints, and PLabel.
5. Fixed memory leak for PNumber, PLabel\$, RobotName\$, RobotSerial\$, GetCurrentUser\$.
6. Fixed problem where sometimes if abort occurred during SavePoints, the point file was deleted and when RC+ was restarted, the point labels were missing.
7. Fixed type mismatch error for VGetPixelXYU, VGetCameraXYU, and VGetRobotXYU when used in VB .NET.
8. Fixed FBusIO_OutW. In previous versions, the port number was on a byte boundary instead of a word boundary.
9. Spaces can now be used in the user name and login ID for users in the Security option.
10. Fixed error 2343, "Output command cannot be executed during Emergency Stop condition"
after an estop has occurred and estop has been reset.

11. Fixed problem where an error occurred if a vision sequence was copied, but the file specified in the ImageFile property did not exist.
12. Byref variables now work correctly in Run | Display Variables.
13. The remote Continue input is no longer accepted if Pause is active.
14. Fixed error 4071 which occurred when a program was started after aborting while safeguard was open.

Revision List v4.1.1 SP1

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What's Fixed in v4.1.1 SP1:

1. Fixed position shift problem after using CP motion to move to certain points.
2. Fixed problem for RC420 seven segment LED display. The wrong error number was being displayed.
3. Fixed Z auto acceleration feature when using Arch parameter in Jump command. In previous versions, sometimes acceleration was reduced when an Arch parameter was supplied for Jump.
4. Now the I/O monitor can be used with Fieldbus when remote I/O is enabled from the Run Window.
5. Fixed automatic project rebuild when project is moved to another computer.

Revision List v4.1.1

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What's New in v4.1.1:

1. Added support for new ProSix models: PS3-AS10*, PS3-AP10*, PS5-AS00*.

What's Fixed in v4.1.1:

1. Fixed syntax help crash when function declaration was over 200 characters.
2. Fixed vision strobe timing problem. Sometimes the wrong image was processed when multiple cameras are used in async reset mode.
3. Fixed error 438 when Calibration data is printed.
4. Fixed problem for TLSet when coordinates are supplied and the first coordinate begins with a decimal point. The decimal point was being deleted.
5. Fixed problem for customer toolbars. After using the Operator Window in Program / Debug mode, if a toolbar was hidden and application focus was switched to another application and back to RC+, the toolbar was visible again.

6. The ModelOK property for the vision Polar object is now hidden from the GUI property page. This property can only be used at runtime.
7. Fixed pause status and pause event after SPELCom.Abort is executed with safeguard open. The first pause after closing the safeguard and continuing did not occur. Also, the Task Manager dialog Pause button was disabled.
8. Fixed Trap Abort for remote and OP. When Abort was executed from these devices, the Trap Abort function did not execute.
9. Changed camera lock sensitivity to higher value to help improve switching between RS170 and CCIR cameras.
10. Fixed jogging for VCalPoints. If VCalPoints was run before Jog & Teach was open, jogging was not working.

Revision List v4.1.0 SP2

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What's Fixed in v4.1.0 SP2:

1. Fixed problem where all brakes were released when Cont was executed immediately after safeguard was closed.

Revision List v4.1.0 SP1

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What's Fixed in v4.1.0 SP1:

1. Fixed SFree / SLock problem for E2H robot Z (J3) axis. After freeing J3 and J4, and then locking J4, the J3 brake was released.
2. Fixed SPELCom VGetPixelXYU, VGetCameraXYU, VGetRobotXYU. The x, y, and u values were not being returned.
3. Fixed problem where SPELCom XQT did not return errors.
4. Fixed V and W jogging buttons on Vision Guide calibration Teach Points dialog.
5. Fixed Threshold button for the VTrain dialog when the object being trained is ImageOp.
6. Now 4 digits can be entered for Point object X and Y property values.
7. TRAP SGOPEN, SGCLOSE, and EMERGENCY are no longer active after all tasks are stopped.
8. Fixed problem for Vision Guide for cameras used in async reset mode with strobe. If there were several tasks running with little or no waits, sometimes the picture from the previous VRun was used for processing.
9. Fixed error "EPSON RC+: Cannot create varmap. Error 8" which

can occur when tasks were run over and over from VB Guide and no task was continuously running.

10. Fixed speed selection for OP500RC Jog & Teach page. Sometimes the speed was not changed to the current setting.
11. Improved load time for Correlation models.
12. Fixed error 2906 if SetNet is used before setting TCP/IP ports from System Configuration.
13. Fixed Reset for standalone controller when executed from within a program. Now outputs are turned off.
14. Fixed error 4242 for Move CP with ProSix robot. When executing Move CP for certain points, error 4242 was occurring.
15. Added error for conveyor tracking when CP motion is used before Cnv_QueueGet. In previous versions, CP motion was allowed before tracking and the tracking position was wrong.

Revisiona List v4.1.0

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What's New in v4.1.0:

1. Continuous jogging is supported.
2. New Walk command has been added to the Run menu.
3. Now jog step distance, jog button orientation, jog mode, jog position mode, and motion command settings are per robot.
4. Pulse latch is now used for sensor conveyor to teach the first point.
5. Added new ExposureTime property for Vision Guide sequences. This allows you to adjust the electronic shutter exposure time for cameras running in asynchronous reset mode.
6. Added new TriggerMode property for Vision Guide sequences. This allows you to select either a leading edge trigger or trailing edge trigger.
7. Programs will now print in color if the current printer can print colors.
8. The vision frame grabber board type is now shown in the VER listing.
9. Now all manuals are accessible from the Help menu.
10. The number of TCP/IP ports can be expanded from 4 to 20.

11. The current user is now displayed on the main window title bar when the Security option is active.
12. ATI PCI force sensors are now supported.
13. Conveyor upstream and downstream positions can be changed without re-calibrating.
14. 6-axis conveyor tracking is supported.
15. Jump :Z(0) has been added to Jog & Teach motion commands.
16. Added new Shutdown event for SPELCom.
17. Added Local selection to conveyor calibration dialog.
18. Now FbusIO_SendMsg supports zero send bytes, which is required for some Profibus DP service messaging.
19. Added new IONumber, EnetIO_IONumber, and FbusIO_IONumber functions. These return the bit number associated with an I/O label.
20. Added new Mask keyword for the Wait statement. This allows you to use a bitmask for an input byte or word.
21. Group numbers are now displayed with the group name in Project Explorer and Project | Edit.

What's Fixed in v4.1.0:

1. Fixed problem for Vision calibration. If motors were turned on during calibration (not before), then the calibration cycle ran in low power mode, so the RobotSpeed and RobotAccel calibration properties were ignored.
2. Fixed problem for Vision mobile camera calibration. If the move to the first camera position took longer than 5 seconds, the SPEL Runtime Drivers connection dialog was displayed. The maximum motion time is now 30 seconds.
3. Point files are now refreshed after SavePoints is executed from the monitor window.
4. Drive unit I/O is no longer displayed in the System Configuration Remote tab when the controller is in standalone mode.
5. The Motion Command on the Jog & Teach dialog is no longer changed when the Robot Control Panel is open.
6. Fixed problems for multiple robots with MDI Jog & Teach. If a point file was saved for a robot number other than the current robot, then the internal point data was incorrect. Also, if Project Robot Parameters dialog was open and the robot number was changed, then after closing the parameters dialog, the Jog & Teach

current position display was incorrect.

7. Fixed crash problem for Vision Guide Geometric object. Some models could cause RC+ to crash.
8. Fixed problem for SPELCom Reset method. Sometimes error 28013, "Tasks are running" error occurred when Reset was called after Estop.
9. The password field is now cleared on the Login dialog after an incorrect password is entered.
10. Fixed type mismatch error when opening projects that were saved on a system with a different locale and Visual Studio was installed.
11. Fixed ShowModel for large Geometric models and large Polar models.
12. Fixed update for locals on Jog & Teach when opened from RunDialog. Now if a new local is defined in a program and RunDialog for Jog & Teach is executed, the new local is available from the Local drop down list.
13. Fixed point files for 6 axis robots when saved on an offline system. V, W coordinates and /B, /F, /J4F, /J6F attributes were not being saved.
14. Fixed VDeleteSequence and VDeleteObject. Sometimes internal errors were occurring.
15. Updated driver for ATI ISA force sensors to fix problem of incorrect data when force value is around 0.
16. Fixed problem for VB Guide SPELCom RunDialog when used with Task Manager.
If the Task Manager was already open when RunDialog was called to open the Task Manager again, the VB application would no longer receive mouse messages.
17. Fixed "Cannot communicate with controller" message on OP if certain tight program loops were executing.
18. Fixed VSet for AngleAccuracy. After AngleAccuracy was entered in a VSet statement, the keyword disappeared.
19. Fixed problem for the function parameters dialog for the Run Window. If the dialog was canceled, RC+ would no longer respond.
20. Fixed problem with RejectOnEdge vision property for multiple results. If a result was not found because it was on edge, it was displayed correctly, but the NumberFound result was incorrect. Now if a result is not found because of RejectOnEdge, it is no longer included in the result set.
21. Fixed point file memory when MDI Jog & Teach was open and a vision

property was changed and saved. The calibration point file for the last calibration was being loaded into point memory.

22. Fixed problem where hofs, calpls, mcofs were cleared if they were entered immediately after adding a new robot (before clicking OK to the System Configuration dialog).
23. Fixed problem where fieldbus outputs could be turned on / off when emergency stop was active and the "Outputs off during emergency stop" SPEL Option was checked.
24. Fixed problem where sometimes after a breakpoint was cleared, the program still halted at the breakpoint.
25. The camera type is now saved during MKVER and restored during SETVER if the frame grabber type has not changed.
26. Improved shutdown of RC+ on RC420 controllers with UPS. In certain cases, RC+ was not shutting down immediately after power was turned off.
27. Fixed problem where changes to Geometric ScaleFactorMin, ScaleFactorMax, ScaleEnabled, and AngleEnable properties did not take affect until RC+ was restarted.
28. Now SPELCom.RunDialog for Memory I/O monitor opens the I/O monitor with the Memory I/O tab displayed.
29. Fixed problem where AngleAccuracy was rounded up after restarting RC+.
30. Now an error is displayed if Ethernet I/O or Fieldbus I/O timeout during reset.
31. Several vision multiple results can now be used with subscripts in a VGet statement, including Found, FoundOnEdge, Compactness, Holes, and Perimeter.

Revision List v4.0.2 SP1

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What's Fixed in v4.0.2 SP1

1. Fixed problem for multiple point files per robot with Jog & Teach in MDI mode. If the current Jog & Teach point file was not default, and the Robot Control Panel was opened, then the Jog & Teach point file was being changed to default, but the point data was not updated. Teaching points was for points in the originally selected point file. This caused point files to become corrupted.
2. Fixed zero position problem for 1 axis Z and 2 axis YZ EZ Modules robots.

3. Fixed position shift problem for 6 axis robot which can sometimes occur after safeguard is open or pause during Jump3, Jump3CP, Move, Arc, and Arc3.
4. Fixed problem for Jog & Teach +Z used for motion commands. After +Z was changed to a value other than zero for Jump, all other subsequent motion commands were moving to a position whose Z value was offset by the original amount.

Revision List v4.0.2

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What's Fixed in v4.0.2:

1. Fixed problem for SavePoints and point labels. If a point file other than the default was loaded, then SavePoints overwrote the point labels with the default point file labels.
2. Fixed problem with SFree in Teach mode. When the safeguard was open in Teach mode, SFree did not work.
3. Fixed SPELCom Clear method. The compiled point data was not being cleared.
4. Fixed problem for LoadPoints. If an illegal point file was being loaded (such as from another robot in the project), no error was being generated.
5. Fixed problem for closing RC+ after it was opened from VB while tasks were running. Before, RC+ could not be closed again until all tasks were stopped. Also fixed Run window status when opening and closing RC+ while being used from a VB Guide application.
6. Fixed tool rotation problem for EZ modules.
7. Fixed arm problem for SCARA robots. When the Joint 2 offset parameter of the ArmSet command was used, the arm configuration (left/right hand) was determined by Arm 0 instead of the current arm.

Revision List v4.0.1

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What's Fixed in v4.0.1:

1. Fixed stability problem for 6-axis robots.
2. Fixed internal error 78 when Jog & Teach was open and a point was being modified from the monitor window and the current point displayed on Jog & Teach was not defined.
3. Fixed problem where if outputs are automatically turned off during EStop, then Fieldbus commands give error 648 after Restart from estop trap handler.

4. Fixed problem when a Geometric object is copied. The SeparationScale property was being set to default.
5. Fixed problem where if the SPEL Options for resetting outputs or outputs off during emergency stop were changed, then outputs were being turned off at shutdown.
6. Now when a mobile or upward camera is calibrated, robot power is retored to the original setting before executing calibration.
7. Fixed error 9074 if the current robot was changed during teach mode.
8. If there were more than 8 robots in the system configuration, the wrong configuration data was being displayed when a robot whose number is greater than 8 was selected from the Setup->System Configuration dialog Robots tab
9. Improved conversion from SPEL for Windows projects. Sometimes, if comments were on the same line as variable declarations, the line was ommitted after conversion.
10. If an invalid lamp output was specified for vision calibration, the correct error message was being displayed, but was being repeated when OK was pressed.
11. Fixed emergency stop and safeguard for Stand Alone mode. These were not functioning in v4.0.0.
12. Fixed internal error 6 that occurred after system was running for more than 24.8 days without restart.
13. Now the status pane will automatically open if it has been closed and errors occur during project build.
14. Fixed problem for Security option. If there were more than 7 users, the user names and passwords were not being saved correctly.
15. Now if jog distances are below default values, they are preserved between sessions, otherwise they are reset to default values.
16. If Recover was called when recover was not required, it would hang until aborted. Now it returns immediately.
17. Fixed problem for VRun when used with a string expression. If there were no robots on the system, error 3100 was occurring if no robot was needed.
18. Fixed VB Guide SPELCom Shutdown method. It was not functioning.
19. Fixed EnetIO_DigSetConfig. When this statement was entered, the keyword was changed and the program could not be compiled.

20. Added Inertia to VER listing.
21. Fixed problem for OP500RC when there are no robots on the system, such as for standalone mode. Sometimes the mode could not be switched from Teach to Auto.

Revision List v4.0.0

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What's New in v4.0.0:

1. The new ProSix 6-axis robot is now supported.
2. Fieldbus I/O for DeviceNet and Profibus DP are now supported.
3. Development GUI has a new Project Explorer and Status window to allow easier access to project files and functions.
4. Robots can now be jogged in local coordinate systems.
5. New SPEL Option called "Auto recover safeguard position" has been added.
6. You can now select which camera to display for multi-camera systems on the Run window, Operator window and SPELVideo control.
7. Now when you create a new vision sequence, you have the option of copying an existing sequence.
8. Menus have been upgraded to new style.
9. Menu command keys can now be configured by the user.
10. New Syntax List and improved Syntax Helper.
11. Jog & Teach dialog is now a child window when used in the development environment.
12. Added Comment Block and Uncomment Block commands to the Edit menu.
13. Added Go To Definition command to Edit menu.
14. DEF file for point names is no longer used. Point names and descriptions are now included in the PNT files.
15. Now variables can be used for D parameter in parallel processing.
16. Long program lines are now word wrapped for print out.
17. Point expressions can now use variables for local number. You must use parantheses around the local number expression.

```
P1 = P2 /(mylocal)
P1 = P* @(mylocal)
```

18. Now when SavePoints is executed, the point labels and descriptions for the currently loaded points are saved in the new file.
19. Added new Vision Guide property called ThresholdColor. ThresholdColor is Black, pixels whose gray levels are between the thresholds are black. When ThresholdColor is White, pixels whose gray levels are between the thresholds are white.
20. Added new Security right called "Change Memory I/O". A user must have this right to change memory I/O bits.
21. Added several new instructions to SPEL+. See the online help What's New section for details.

What's Fixed in v4.0.0:

1. Fixed Scale result for Vision Guide Geometric object. Now it returns a floating point number.
2. Fixed Vision Guide Frame object draw in design mode for Correlation and Geometric objects.
3. Fixed function parameter of type Boolean. This was compiling with errors.
4. Fixed point label problems for labels with 16 characters (maximum length) containing the same characters in different places.
5. Fixed Ethernet I/O configuration for D64RS rack. Some modules were being displayed incorrectly with this rack was being used.
6. Fixed hang when SPELCom_Event is called from a trap abort function after SPELCom.Abort was executed.
7. Fixed Eval for Reset command and commands with syntax errors.
8. Fixed error generation for SPELCom motion commands that use relative offsets, e.g. SPELCom.Go "P* -Z5". In previous versions, if an error occurred, it was thrown, but error number was 0 and the error message was blank.
9. Fixed problem with Trap for I/O condition during CP motion. Sometimes the trap would not fire.
10. Fixed standard deviation calculations for Vision Guide statistics. If the samples all had the same values,

the standard deviation was not zero.

11. Fixed "Invalid parameter error" that sometimes occurred for Trap Gosub.
12. Fixed problem for setting breakpoint. If the characters "fend" were in a comment or literal string, the breakpoint could not be set.
13. Fixed problem for Robot Parameters | Range tab | Default button for range values for YZ robots. The Z range values were being set to zero.

Revision List v3.6.2

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What's New in v3.6.2:

1. Added new TaskStatus event for SPELCom control. See help on EventReceived for details.
2. Added new CommandCompleted event to SPELCom control.
3. Added AsyncMode property to SPELCom control. This allows several methods to be executed asynchronously.
4. Added two methods to support SPELCom AsyncMode: WaitCommandComplete and WaitAbortComplete.
5. The SPELCom control is now thread safe for use with VC++ 6.0 and 7.0, VB .NET, and C#.
6. Added new commands for Ethernet I/O to support counters. ENetIO_ReadCount, ENetIO_DigGetConfig, ENetIO_DigSetConfig. Any digital input can be configured as a counter. Quadrature encoder counters are also supported.
7. Added support for several Ethernet I/O modules: SNAP_AIMA, SNAP_AIMA-4, SNAP-AIARMS, SNAP-AIVRMS, SNAP-AOA3, SNAP-AOA23, SNAP-AOA28, SNAP-AOD29, SNAP-IDC5Q, SNAP-AICTD, SNAP-AICTD-4, SNAP-AIR40K-4, SNAP-AIRATE, SNAP-AIRTD, SNAP-AITM, SNAP-AITM-2
8. The default setting for the SPELCom Timeout property has been changed from 10 to 0 (disabled).

What's Fixed in v3.6.2:

1. Fixed Cnv_RobotConveyor function when used in an expression.
2. Improved timing for Trap Error and Trap Abort.
 - Trap Error is no longer aborted by the system before it's finished.
 - Now the Trap Error routine must complete before Trap Abort is called (if armed).

-Now if there is a Trap Abort handler in SPEL+ and Abort is executed from SPELCom, the SPELCom Abort waits for the Trap Abort routine to execute before returning.

3. Now if Cont is executed from a SPEL+ task, the SPELCom pause state is set to false.
4. Fixed problems for robot joint enable/disable. After a joint was disabled, it could not be re-enabled. Also, Hofs, Calpls, and McOfs were not being restored after disabling a joint.
5. Fixed DetailLevel for Vision Guide Geometric object. When the Geometric object was taught, the DetailLevel was internally being changed to High.
6. The SPELCom control no longer has an error if you set DesignMode to True to open EPSON RC+, then execute Stop Debugging from Visual C++ and restart the application.
7. Fixed Stat(0), bit 0x20000 (Pause). Now when safeguard is open and closed, this bit is on.
8. Added new warning messages when RC+ starts:
 - a. If one or more options have been installed, but there is no software options key or the options are not enabled in the key.
 - b. If one or more options are enabled by the user, but the option is not installed.
9. Fixed Cnv_Point for sensor conveyor. In previous versions, x and y arguments were ignored.
10. Improved conveyor tracking for pick up position.
11. Fixed video display for Run window and Operator window. Sometimes after the first VRun, the video was not updated.
12. Fixed internal error 5 for Japanese Windows that sometimes occurred when OK is clicked on the System Configuration dialog and the Windows task bar Always on top property is off.

Revision List v3.6.1

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What's New in v3.6.1:

1. EZ Modules are now supported.
2. PG robots are now supported.
3. Cnv_AbortTrack and Cnv_Fine conveyor tracking commands are now supported.

4. Vision Guide Show Model dialog now uses nearest neighbor algorithm to display zoomed model and model origin cross hair width is the same as the zoomed pixel width.

What's Fixed in v3.6.1:

1. Fixed problem where user clicks on X button to close RC+, but cancels saving the program. Then Project | Save All would not work.
2. Fixed problem for Input statement when used after a Print statement that suppresses the end of line.
For example:
 Print "Enter value",
 Input aValue
3. More data validation was added to Vision Guide calibration cycle. Now if data is invalid during calibration, such as with invalid robot points or vision results, the correct error message is displayed, instead of internal errors.

Revision List v3.6.0

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What's New in v3.6.0:

1. Added support for OP500RC operator pendant.
2. Added optional error number parameter to Trap Error. This allows you to obtain the error number of the trapped error. See help for details.
3. Vision Guide calibrations now support robot Base settings other than default.
4. Security passwords are now displayed in asterisks on the Setup | System Configuration dialog Security tab.
5. The nomenclature for Attend On/Off has been changed to Teach / Auto. Teach mode corresponds to Attend On and Auto mode corresponds to Attend Off.
6. Added two new events for VB Guide:
Teach mode and Auto mode.
See help on EventReceived for details.
7. Improved Vision Guide camera switching. Now when the frame grabber camera channel is switched, the video signal is locked more reliably before the next grab. Also, the delay time between camera switches has been reduced.

What's Fixed in v3.6.0:

1. FmtStr no longer appends a CRLF at the end of the formatted string.

2. Fixed problem with moving to points from Vision Guide jog tab if Project Save As was executed using a project name that never previously existed.
3. Fixed Wait when used with the following functions:
In, InW, Out, OutW, Ctr, Lof, Motor, MCalComplete

It was not waiting for the expression to become true when these functions were used.
4. Fixed Defaults button for Inertia tab of Robot Parameters dialog. The values were incorrect.
5. Fixed problem for Exit Do inside For...Next. The For loop was exited, not the Do loop.
6. If \$ prefix was not used with memory I/O label in an On or Off statement, then the statement compiled incorrectly. Now a \$ is added automatically.
7. XC55n camera type can now be selected when using Meteor2/MC frame grabber.
8. Fixed problem with error 419. Previously, if one task was waiting to execute certain commands (including vision) and several other tasks were also executing these commands, then after 3 seconds error 419 could occur.
9. Fixed overflow error for Vision Guide Edge tool. If an edge was found, and then not found for a few hundred cycles, an overflow error could occur. This exact not found count depends on the score when found.
10. Fixed local variable problems when tasks were being Quit and no abort occurred. Sometimes local variable values could be changed after making a function call. This was more likely to happen when SPEL+ tasks are started from VB Guide.
11. If the MsgBox title parameter is blank or empty, the system was hanging.
12. Fixed problem for breakpoints. If you resume a task, then clear a breakpoint, the breakpoint appeared to be cleared, but it was not.

Revision List v3.5.0

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What's New in v3.5.0:

1. Windows 2000 is now supported.
2. Added new Conveyor Tracking option.
3. Added stand alone mode support. This allows PC control unit

to be used as an I/O controller.

4. Added support for Japanese and German GUI.
5. Added new functions PLabel\$ and PNumber. PLabel\$ returns the point label associated with a point number. PNumber returns the point number associated with a point label.
6. The Pulsar frame grabber board for the Vision Guide option is no longer supported.
7. Added StartPointObject, StartPntObjResult, StartPointType, EndPointObject, EndPntObjResult, EndPointType to Edge tool in Vision Guide.
8. Added three new events for VB Guide:
Continue, Motor On/Off, Power High/Low.
See help on EventReceived for details.
9. Borland Delphi is no longer supported in VB Guide.
10. Duplicate I/O labels and User Error labels are now checked at save time, not at entry time. This allows you to copy and paste groups of labels, then change the copied labels, without error messages.
11. Duplicate point labels are now checked at save time, not at entry time, when using the point file editor. This allows you to copy and paste groups of labels, then change the copied labels, without error messages. When entering point labels from Jog & Teach, duplicates are still checked at entry time.
12. Vision Guide Correlation objects can now find up to 999 results.

What's Fixed in v3.5.0:

1. Fixed compiler for I/O labels used on left side of statement. Now the correct error occurs during build.
2. Function drop down list now works on programs that use line numbers.
3. Fixed CurrentResult property for Vision Guide. Setting CurrentResult from SPEL+ was setting the value to 1 internally.
4. Fixed occasional "Permission denied" error when deleting a project.
5. Now Ethernet I/O can be monitored when SPEL drivers are not enabled.

6. Fixed AngleEnable property for Vision Guide Correlation object. If AngleEnable is changed from True to False, angle results are now 0, instead of previous angles.
7. Fixed expression with negative numbers on both sides of statement. For example, this statement would not compile in previous versions:
 If -1 + 1 = -2 Then
8. Fixed EResume Next problem. Sometimes in a fast loop that causes an error and the error handler used EResume Next, the task would stop.
9. Fixed save problem for point files from Jog & Teach. Sometimes when working with multiple point files, a point file would not be saved properly when switching files.
10. Made improvements for SPELCom events. In previous versions, after Abort was called, no events were being fired until RESET was executed. This has been fixed. Also, if Pause is executed from VB and no tasks are running, a Pause event is fired.
11. Fixed problem for jump to function from toolbar. If program window was maximized, then jump to function would change the window state to normal size.
12. Video is no longer disabled when focus is lost and color resolution is 16 bits / pixel or more.
13. Variables will now work in parallel processing statements.

Revision List v3.4.1 SP3

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What's Fixed in v3.4.1 SP3:

1. Fixed remote outputs for current robot. When the current robot is changed via remote inputs, the remote outputs related to robot status were not being updated.
2. Fixed Wait when used with the following functions:
 In, InW, Out, OutW, Ctr, Lof, Motor, MCalComplete

 SPEL+ was not waiting for the expression to become true when these functions were used in a Wait statement.
3. Fixed mouse caret for Vision Guide sequence and object properties. If you clicked on a result value, then clicked on a property that contains text, the text cursor (caret) did not appear.

Revision List v3.4.1 SP2

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What's Fixed in v3.4.1 SP2:

1. Fixed problem for quick pause. If QP OFF is executed in a program and QP ON is executed later, Pause did not work correctly.
2. Fixed error 4242 when safeguard was opened during Pass and Cont was executed.
3. Fixed crash condition that can occur when EXIT FUNCTION is used in a single line IF statement.
For example:
If a = 1 Then Exit Function

In rare cases, this could cause RC+ to crash.
4. Fixed problem for Vision Guide calibration.
In the Calibration dialog, only 4 cameras were allowed for Meteor2 frame grabber. This has been fixed to allow 12 cameras for Meteor2.

Revision List v3.4.1 SP1

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What's Fixed in v3.4.1 SP1:

1. The ES653S robot model can now be added.
2. Error 4103 was fixed when jogging to teach calibration points from Vision Guide.
3. The I/O type column was fixed for the I/O Label Editor when used with Ethernet I/O.
4. Fixed video update when strobe is used.
5. Fixed remote outputs for current robot.
6. Fixed problem for Error statement. If Error was used in a function without error handler, then variables in the calling function had incorrect values.
7. Fixed local variable initialization problem. If a program was aborted, then run again, the local variables in the aborted function were not being initialized.
8. Fixed error 76 when Setup | System Configuration was selected and Vision Guide was installed in VGA mode.

Revision List v3.4.1

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What's Fixed in v3.4.1:

1. Default points are now loaded after switching group using remote inputs.
2. First Print statement can now be seen on the Operator Window

after starting a program using remote input.

3. Hofs and MCOfs can now use 8 digits from the Robot Configuration dialog.
4. Fixed auto start from Operator Window if mode was switched to Program / Debug during start up. Now auto start is correctly disabled in Program / Debug mode.
5. Fixed step through Restart and Chain statements.
6. Newly added point files are now displayed in the Jog & Teach dialog point file drop down.
7. Fixed problem with For...Next when used in a GoSub routine.
8. Fixed problem where sometimes the label for P0 was being deleted when switching point files from Jog & Teach.
9. CtrlDev function now returns correct values.
10. RobotModel\$ and RobotType functions now work without the RobotNumber parameter when used in an expression. In previous versions, you had to always use the RobotNumber argument.
11. Fixed Run Window title when CtrlDev is remote.
12. You can no longer change the group on the Run window when tasks are running.
13. The Point number column is now displayed correct when opening the I/O label editor for Ethernet I/O.
14. Fixed ByRef variables when used on right side of statement inside a function other than the main function.
15. Fixed memory access violation errors that sometimes occurred with ParseStr or Redim string.
16. Fixed variable display using mouse hover for function parameters.
17. Fixed password for Administrator in Security option. It was not functioning.
18. Fixed TCP/IP_PortNumber parameter for SetNet. Now an expression can be used.
19. Fixed problem for Jog and Teach and P* when safeguard is open. Now when safeguard is open, robot XYZU coordinates are updated correctly and the Teach button for Jog and Teach and P* in user programs now works correctly.
20. Fixed Homeset GUI. If Homeset was not defined, and you view

the Homeset tab from Projects | Robot Parameters and click OK, then the Homeset values were changed to -999999999. Now they are not changed.

21. Fixed error 419. This error occurred if multiple tasks were attempting vision commands and a sequence was taking more than 3 seconds. Now the timeout is 30 seconds.

Revision List v3.4.0

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What's New in v3.4.0:

1. Support for ANSI/RIA 15.06-1999 has been added. Robot motors will now turn off when the safeguard is open. Attend Mode has been added to allow jogging and slow motion with the safeguard open while holding a dead man three position enable switch. Refer to the Safety chapter in the EPSON RC+ User's Guide for more information.
2. Now the default installation drive is D, if it is available. When configured at the factory, drive D is used for EPSON RC+ because it is formatted as an NTFS drive, which is more reliable. It is recommended that you always install on drive D when not using EPSON RC+ off line.
3. I/O labels can now be used in expressions. This allows you to pass a label to a function or use it in an integer expression.
4. During stepping through code, if the step line is the last line in the window, the step line is centered in the window.
5. Now there is a message box stating when a Find has been completed, instead of wrapping around to the first search result.
6. The OCR object Character Constraints dialog was improved. Now the font characters are displayed and can be copied and pasted into the constraint column.
7. A pop up menu has been added to the Jog and Teach dialog for Free Axes. If you right click anywhere in the Free Axes group, a menu is displayed to Free All or Lock All.
8. Improved connection time for OpenNet. A new parameter has been added to specify Server or Client.
9. Added new operation modes:
 - Production / Debug
 - Production / Operator
 - Production / Remote

See the on line help for details.

10. Added status bar to Operator Window to show emergency stop, safe guard, and date/time.
11. Added the following remote outputs:
 - AtHome: This output is only on when the robot is at the home position.
 - EnableOn: This output is on when the dead man switch is engaged during attend mode.
 - MotorMode: Current user motor mode setting.
 - PowerMode: Current user power mode setting.See on line help for details.
12. Now remote input and output names can be used in I/O status functions Sw and Oport. For example:

```
If Sw(AtHome) = Off Then
    Home
EndIf
```
13. Now the Run Window function list displays function names in sorted order after the main function.

What's Fixed in v3.4.0:

1. Fixed CX, CY, CZ, CU, POrient, and PLocal when used with P(expr) or Pnumber.
2. Added EStop and Safety status to the main window status bar.
3. Added new SPEL+ function called JT. JT returns the status of the last Jump command for the current robot. See help for details.
4. Fixed import for user errors. User errors could not be imported from other projects.
5. Fixed font change for editor. If monitor window was open when editor font was changed, the monitor window used the editor font until the next session.
6. Fixed the RTS/CTS check box for Comm Ports configuration in Setup | System Configuration | Comm Ports.
7. Fixed vision graphics when OCR tool is in use. Sometimes when stepping through a sequence, some objects were being drawn with dotted lines instead of solid lines.

8. If a comment included two or more apostrophes, then during debug stepping, the debugger would step through the line containing the comment.
9. The vision Correlation object no longer moves to its CenterPointObject position during teach.
10. If User Errors are changed, the event is now logged in security audit database.
11. Fixed User Errors. If a label was removed, the project programs were not being recompiled.
12. Fixed OCR frame problem. If an OCR object was in a frame and the frame step was changed because an object with a lower step number was deleted, a type mismatch error was occurring when the sequence was run.
13. Fixed problem for Correlation object. After starting a session, the search parameters were set internally to the values at teach time.
14. Fixed Display Variables dialog for local strings. When the string value was changed, the new value was not being retained.
15. Fixed bad identifier error when using mixed data types with Input. For example, the following statement was causing an error: Input a, b\$
16. User function names can no longer have the same name as a DLL function name. Now an error will occur.
17. Fixed problem for point labels that were maximum length (16 characters). In 3.3.0, internal errors were occurring during point file save or project build. In previous versions, point labels with 16 characters were causing memory corruption.
18. Fixed line numbers when errors are reported and program has been numbered.
19. Fixed bug for CameraBrightness and CameraContrast properties. They were not being loaded when a new session of EPSON RC+ was started. This only affects vision systems with Meteor2 frame grabbers.
20. Fixed error 231, 'MCAL has not been completed' during VRun at runtime if robot is not robot 1 and MCAL is executed at runtime.
21. Fixed PDef function so it handles point labels and Pxxx.
22. Fixed Point object when used with Frame. If the point location is not in the video image, it is considered not found.

23. Fixed VGet when some arguments are an array variable but the last argument is not. Error 416, "Not an array", was occurring.
24. Fixed problems for nested #ifdef statements.
25. Fixed XYLim, Local functions. These functions return a point.
 p1 = XYLim(1)
 p2 = Local(1)
26. Fixed TlSet when used with a point.
 TlSet 1, p1
27. Fixed macros that defined multi-statements when defined in an include file.
 #define PRN_DATA(a, b) Print "Data a = ", a; Print "Data b =", b
28. Fixed build problem for include files. If an include file had a statement with a syntax error, then the compiler would not catch it.
29. Fixed For...Next problems:
- A. When Exit For or Exit Function was used to abort a loop in a called function from another For...Next, the loop would not terminate.
 - B. If the For...Next variable value was already outside the range of the loop, the loop was executing one time. Now it does not.
30. Fixed single line If problem when multi-statements are used. Multi-statements were not all attached to the if condition. For example, in the following code, b was printed, even though the If condition was false.
- ```
a = 0
If a = 1 Then b = 2; Print b
```
- Now all multi-statements on a single line If statement are only executed when the If condition is true.
31. An expression can now be used in the Pallet function for the palletNumber parameter.  
 For example:  
 P1 = Pallet(a + 1, 1, 1)
32. Improved Select TRUE for certain Case statements to be more compatible with the SPEL language used on SRC-3\*\* controllers. Since TRUE is -1 in SPEL+, but 1 in SPEL, the following statements were not executing properly, because Sw(xxx) or Oport(xxx) evaluate to On (1) or Off (0), instead of -1 or 0. Now this code will work in SPEL+, too.

```
Select TRUE
 Case Sw(1)
```

```
 Print "case 1 is true"
Case Sw(1) And Sw($2)
 Print "case 2 is true"
Case Oport(3)
 Print "case 3 is true"
Send
```

However, we recommend adding a Boolean expression to make it read more clearly:

```
Select TRUE
 Case Sw(1) = On
 Print "case 1 is true"
 Case Sw(1) = On And Sw($2) = On
 Print "case 2 is true"
 Case Oport(3) = On
 Print "case 3 is true"
Send
```

33. Fixed problem for robot point file on Jog & Teach after changing the current robot outside of Jog & Teach. The wrong point files were shown in the Point File drop down list.