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- Improved productivity
- World-class customer service and support
- Cost-effective, high-quality solutions
- A commitment to the environment

Discover how Epson can help you work toward the future. www.epson.com/forbusiness

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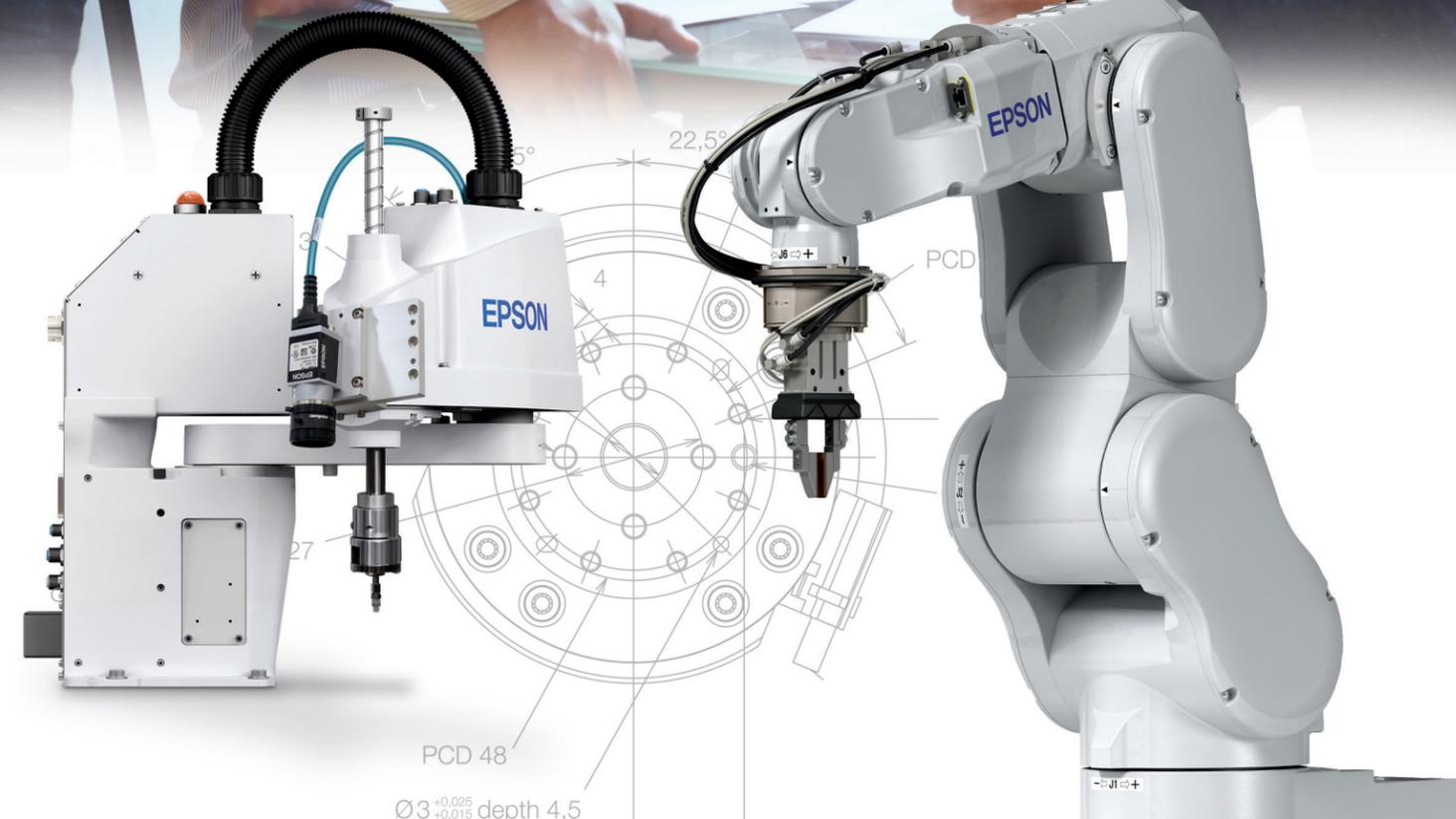
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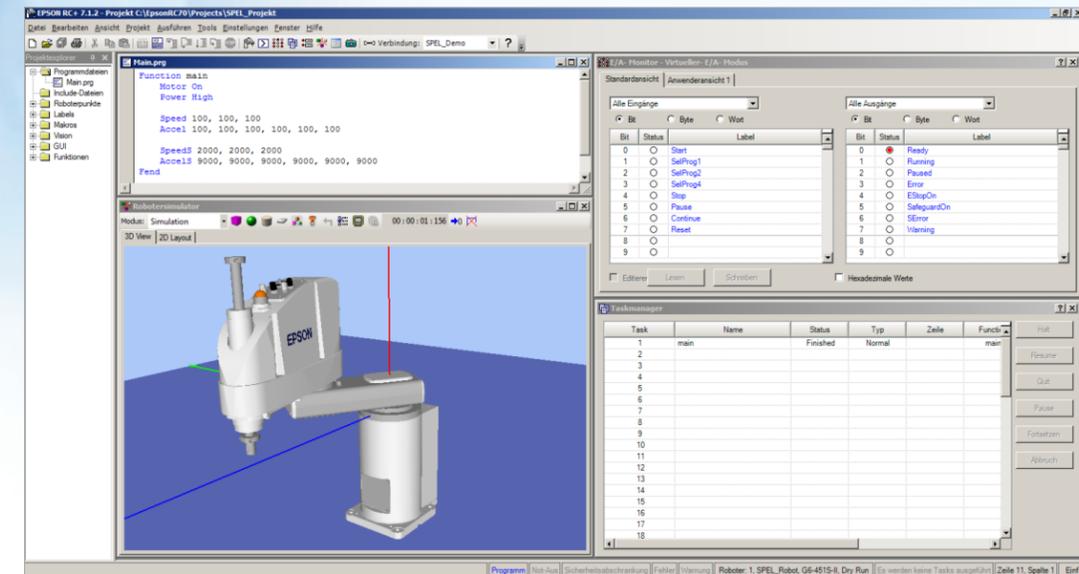
Epson RC+®
DEVELOPMENT
SOFTWARE



Setting a new standard in automated robot solutions

As an advanced suite of software designed to help users quickly and easily implement automated robot solutions, Epson RC+ offers a powerful set of tools and features that redefine automation efficiency. A comprehensive solution for virtually any application, Epson RC+ provides seamless integration, with all components working together in one integrated environment.

As the smart choice for robotic system development, Epson RC+ features the powerful SPEL+ programming language, 3D simulation software and more. Integrated options such as Vision Guidance, Parts Feeding, Force Guidance, Conveyor Tracking and others enable fast and reliable automation applications. Intuitive by design, Epson RC+ offers a powerful GUI, searchable online help menu, setup wizards and templates that help to reduce overall development time.



The ultimate choice for robot system development

With Epson RC+, there's no need to reinvent the wheel. This advanced software works seamlessly with Epson's full line of high-performance robots, so you can get up and running quickly. Other benefits include:

- Less time required for development – helps save time and money, enables quicker implementation
- Integrated 3D simulator – verify and visualize motion execution and cycle times
- Ready when you are – take the program offline when it's convenient

Epson RC+ included with robot purchase.

No recurring licensing fees; other manufacturers could charge you thousands of dollars extra.

SPEL+ Language

Epson's SPEL+ is a powerful yet easy-to-learn-and-use programming language built specifically for robot automation applications. Experienced programmers familiar with other languages can easily adapt, while beginners find it simple to learn, due to its intuitive commands, syntax assist, and auto indentation structure.

With 500+ commands and statements, including motion functions, I/O control, variables and data types, program control and more, SPEL+ can be used for both complex and simple applications.



SPEL+ command categories include:

System Settings Management:

- System Management
- File Management
- Security Levels
- Database Usage

Robot and Motion Settings Management:

- Robot Control
- Torque Settings
- Conveyor Tracking
- Force Sensing
- Pulse Generator

Position and I/O Management:

- Point Management
- Coordinate Types
- Fieldbus I/O
- Memory I/O
- Analog I/O

Executable Commands and Logic:

- Program Control
- Program Execution
- Pseudo Statements
- Numeric Values
- String Values
- Logical Operators
- Variable Commands

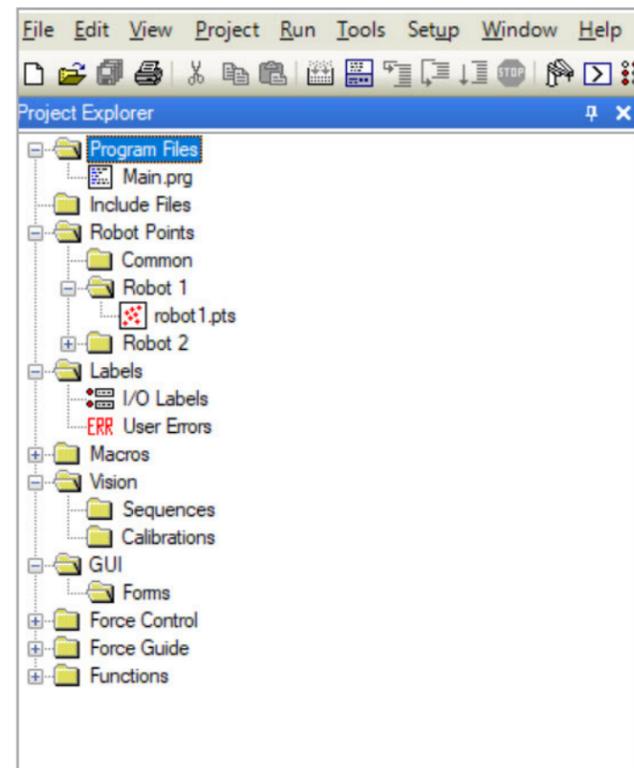
Part Movement Program Example

```
Function main
  Long cycleCount
  If Motor = Off Then           ' If the motors are off, turn them on
    Motor On
  EndIf
  Power High                   ' Set the power to high
  Speed 50                     ' Set the speed to 50%
  Accel 50, 50                 ' Set the acceleration / deceleration to 50%

  Do
    Jump pick :Z(0)            ' Infinite loop
    Wait Sw(PartinPos) = On    ' Start above pick position
    Go pick                    ' Wait for part present sensor to turn on
    On Gripper                 ' Go to the pick position
    Wait .1                    ' Grip the part
    Jump place                 ' Gripper delay
    Off Gripper                ' Jump to the place position
    Wait .1                    ' Turn off the gripper
    cycleCount = cycleCount + 1 ' Gripper release delay
    Print "Cycle count: ", cycleCount ' Increment the cycle count
    Display the cycle count
  Loop
Fend
```

Intuitive Project Management

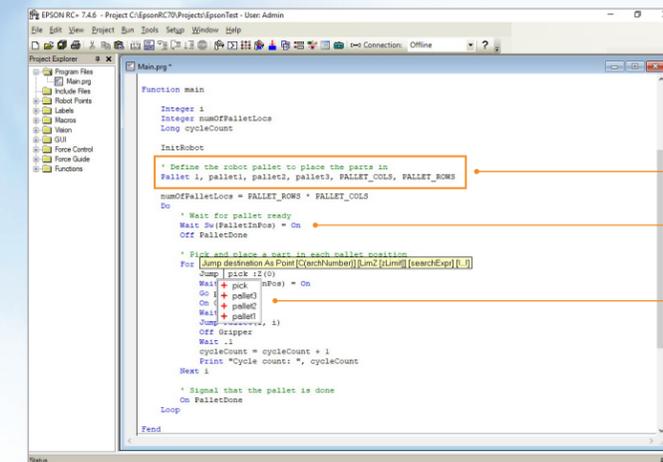
- Easily copy and move files (points, programs, functions)
- Import projects and points
- Easily share data among different projects
- Reuse blocks of code between projects



Editor

Auto-assist makes editing easier than ever

Epson RC+ includes powerful editing capabilities to minimize mistakes and streamline program development. In addition to basics such as cut, copy and paste, it also includes syntax assist, auto-indent, color-based command usage, comment blocks, indent/outdent, find/replace and more.

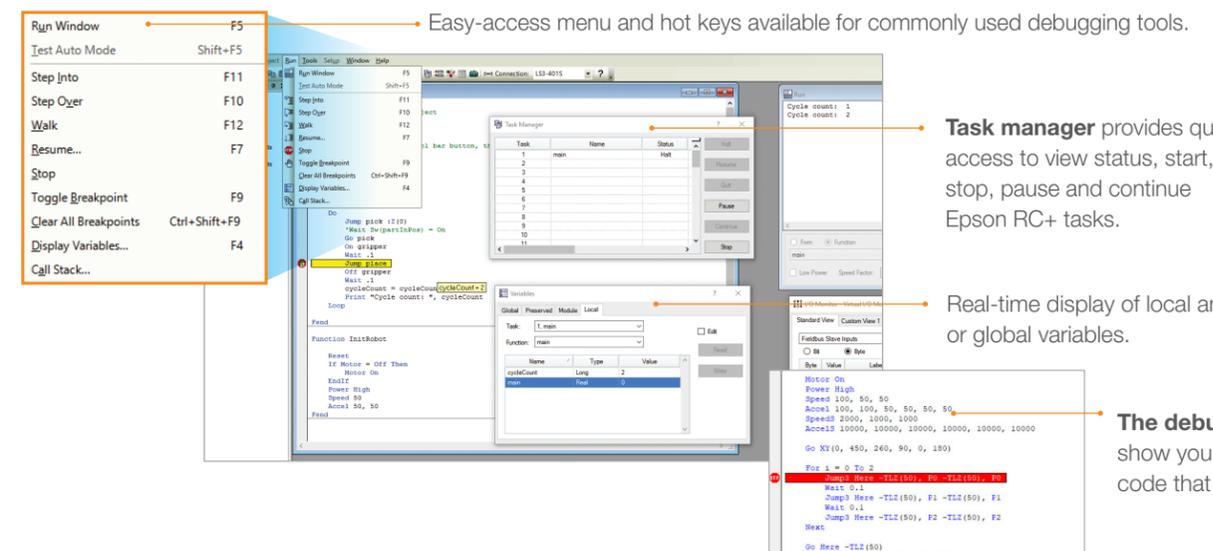


- **Color-based editor** where keywords are in blue, parameters in black, comments in green and incorrect syntax in red.
- **Automatic indenting of code** contained in a function block for easy readability.
- **Syntax Assist** helps users type or select the proper syntax for commands and their associated parameters.

Integrated Debugger

Easily identify issues in record time

The integrated debugger offers many clever ways to check the status of your program or identify issues you may find while running it. The Epson® debugger allows you to check specified variables, view the value of those variables in real time, set break points, perform a single-step execution, or jump over certain steps. You can also step into a function to view more details.



- **Task manager** provides quick access to view status, start, stop, pause and continue Epson RC+ tasks.
- Real-time display of local and/or global variables.
- **The debugger** will show you the line of code that is in error.

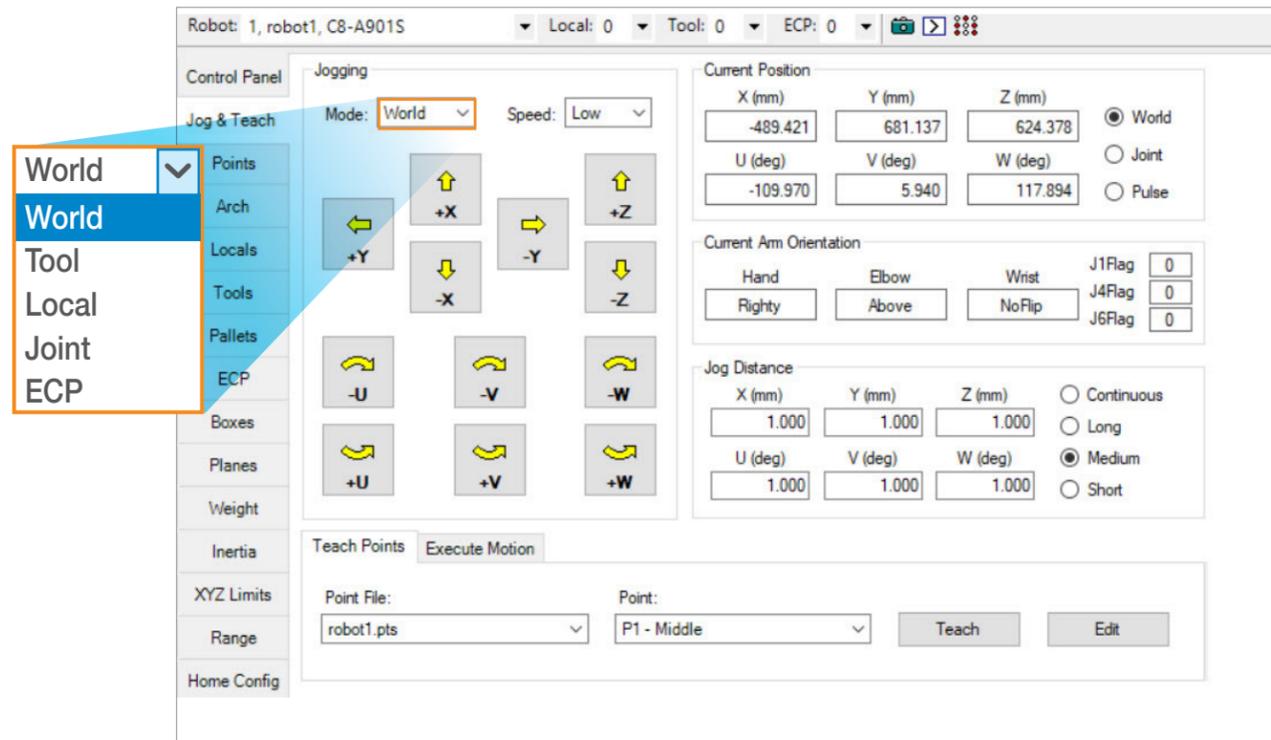
All-inclusive development environment

- Projects
- Robot Manager
- Task Manager
- Run Window
- Operator Window
- Jog and Teach Window
- I/O Monitor
- Offline Development
- Wizards
- Project Explorer
- Toolbar Customization
- 3D Simulator

Robot Manager

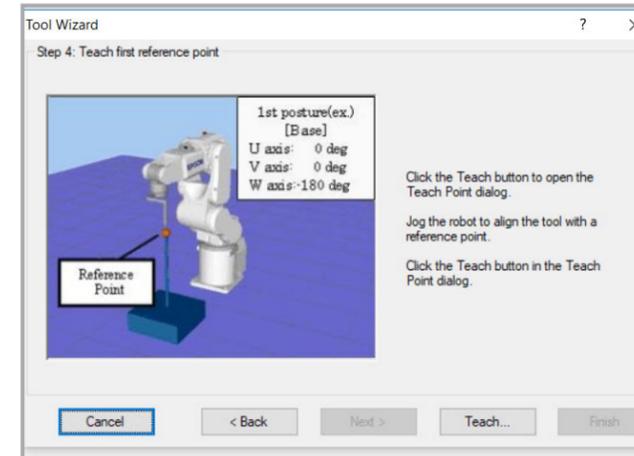
Robot manager is an intuitive graphical interface that enables users to manage functions and wizards to simplify automation tasks:

- Jog Functions (World, Tool, Local, Joint, ECP)
- Manage Points (Teach, Name, Add descriptions)
- Set Weights, Inertia, Range, XYZ Limits
- Set Custom Home Position

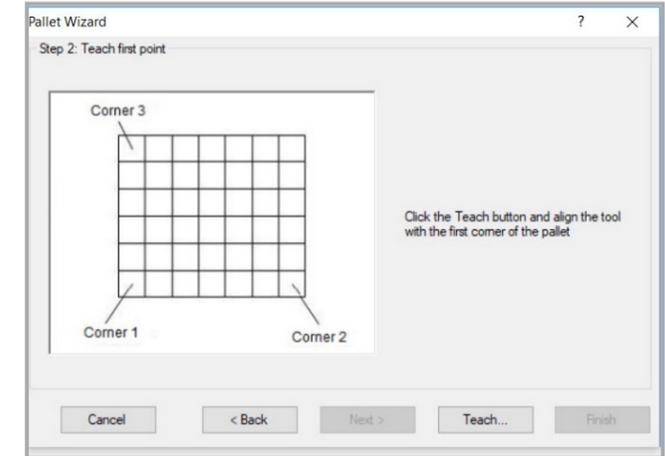


Jog the manipulator in World, Joint, Tool, Local or ECP Mode

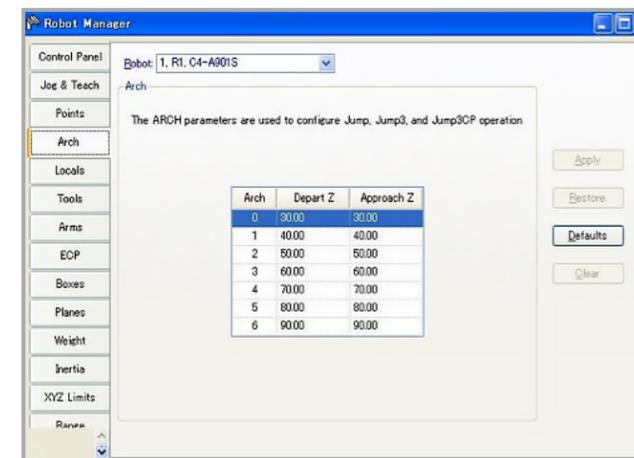
Wizards



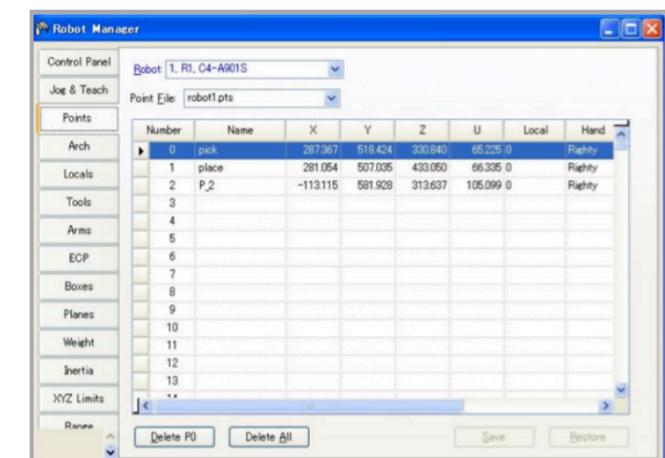
Tool Wizard – Quickly teach and name new tools – Follow the step-by-step instructions to teach a 2D or 3D tool using from 2 to 5 points. Teach up to 15 tools.



Pallet Wizard – Easily configure and teach a work piece pallet by defining the rows and columns and teaching 3 to 4 points. Up to 15 pallets per project.



Arch – This page allows you to configure the depart Z and approach Z settings in the robot's Arch table. Arch is used for the Jump, Jump3 and Jump3CP motion commands. There are 7 different setting pairs in the Arch table.



Points – You can input/delete/name the point data. When a point file is selected, the robot controller loads the file into memory. As points are taught on the [Robot Manager]-[Jog & Teach] page, the spreadsheet on the Points page is updated.

Help Menu

Epson RC+ features an integrated help system that is right at your fingertips; select any keyword and hit F1 to launch the help system:

- Context
- Sample code and how it's used
- Parameter definitions

Jump Method, Spel Class
[See Also Example](#)

Description
 Moves the arm from the current position to the specified point using point to point motion while first moving in a vertical direction up, then horizontally and then finally vertically downward to arrive on the final destination point.

Syntax
 Sub **Jump** (PointNumber As Integer)
 Sub **Jump** (Point As SpelPoint)
 Sub **Jump** (Point As SpelPoint, AttribExpr As String)
 Sub **Jump** (PointExpr As String)

Parameters
 Each syntax has one parameter that specifies the end point which the arm travels to during the Jump motion. This is the final position at the end of the point to point motion.

PointNumber	Specifies the end point by using the point number for a previously taught point in the Controller's point memory for the current robot.
Point	Specifies the end point by using a SpelPoint data type.
AttribExpr	Specifies the end point attributes by using a string expression.
PointExpr	Specifies the end point by using a string expression.



I/O Monitor and Label Editor

The I/O monitor window lets you monitor all the controller hardware inputs and outputs, as well as memory I/O. There are up to four views available – standard view and up to three custom views. For each custom view, you can specify a list of any combination of input, output or memory.

The I/O Label Editor lets you define meaningful names and descriptions for inputs, outputs and memory I/O for each project. The labels can be used in the program, command window or macros. The Label Editor will show standard I/O and memory I/O, as well as any additional options such as extended I/O, drive unit I/O, fieldbus master, fieldbus slave and Euromap 67.

I/O Monitor - Virtual I/O Mode

Standard View Custom View 1

All Inputs

Bit Byte Word

Bit	Status	Label
0	<input type="radio"/>	Start
1	<input type="radio"/>	SelProg1
2	<input type="radio"/>	SelProg2
3	<input type="radio"/>	SelProg4
4	<input type="radio"/>	Stop
5	<input type="radio"/>	Pause
6	<input type="radio"/>	Continue
7	<input type="radio"/>	Reset
8	<input type="radio"/>	
9	<input type="radio"/>	

All Outputs

Bit Byte Word

Bit	Status	Label
0	<input checked="" type="radio"/>	Ready
1	<input type="radio"/>	Running
2	<input type="radio"/>	Paused
3	<input type="radio"/>	Error
4	<input type="radio"/>	EStopOn
5	<input type="radio"/>	SafeguardOn
6	<input type="radio"/>	SError
7	<input type="radio"/>	Warning
8	<input type="radio"/>	
9	<input type="radio"/>	

Edit Hexadecimal Values

I/O Label Editor

Input Bit	Label	Description
0	Start	This input will start the system
1	TerminateLoop	This input will stop the loop
2	Prime_Eye	
3	Backup_Eye	
4	Home_Prox	Used for homing main drive
5	System_Pressure	System Air Pressure
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3D Simulator

Build and fine-tune your application before hardware setup

Take automation development to the next level with a virtual test run. Epson's workcell simulator means you can program your workcell, even before your hardware has arrived. See a 3D simulation of your application in action – in real time. You can even add additional components that may be a part of the workcell, such as a table, feeder or various types of guarding. Add a tool to the robot's arm and implement your program to examine the efficiency of the application.

This convenient tool offers a host of benefits:

- **Visualization tool** – share your simulation among various engineering disciplines
- **Cycle time verification** – using specific application details (layout, tooling, payloads, precision)
- **Optimize throughput** – modify parameters through simulations
- **Sales tool** – build confidence by showing 3D simulated workcells to potential customers
- **Test programs** – using various environments, even with multiple robots in a cell



Features include:

Cycle-time Calculation

- Calculate cycle time based on real application execution

Offline Application Checking

- Programs can be created and debugged from standalone PCs
- Debugged programs can be rolled out directly to plant floor workcells

Machine Vision Simulation

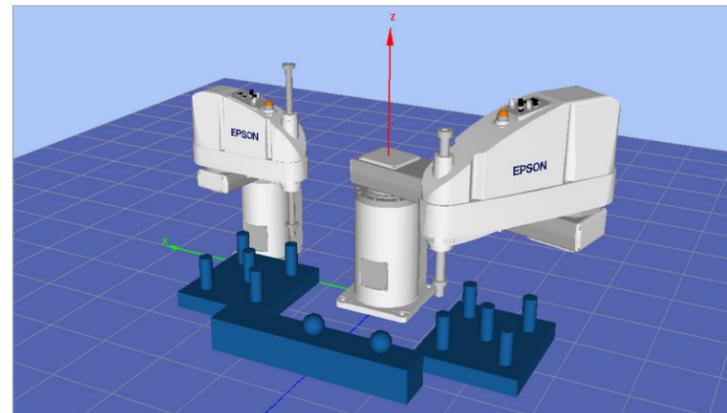
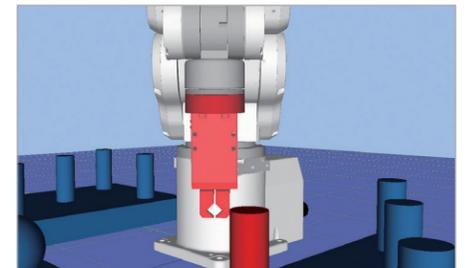
- Machine vision image processing input can also be used within simulations

Record and Playback Functions

- Recording and playback functions make it easy to include still images and movies in presentations

Clearance Checking

- Choosing the right robot is easy because you can check all necessary workcell and peripheral equipment



Need to examine how multiple robots might affect productivity? Give it a test run with a detailed, simulated workcell.

Full-featured simulator supports up to three robots and peripherals such as guarding, tools, parts and more.

Integrated Options

One environment, one comprehensive solution

These powerful solutions make it easy to quickly build various applications without having to worry about peripheral communication setup and development from multiple environments. Reduce your programming time and focus on maximizing the efficiency of your application.

Epson Vision Guide

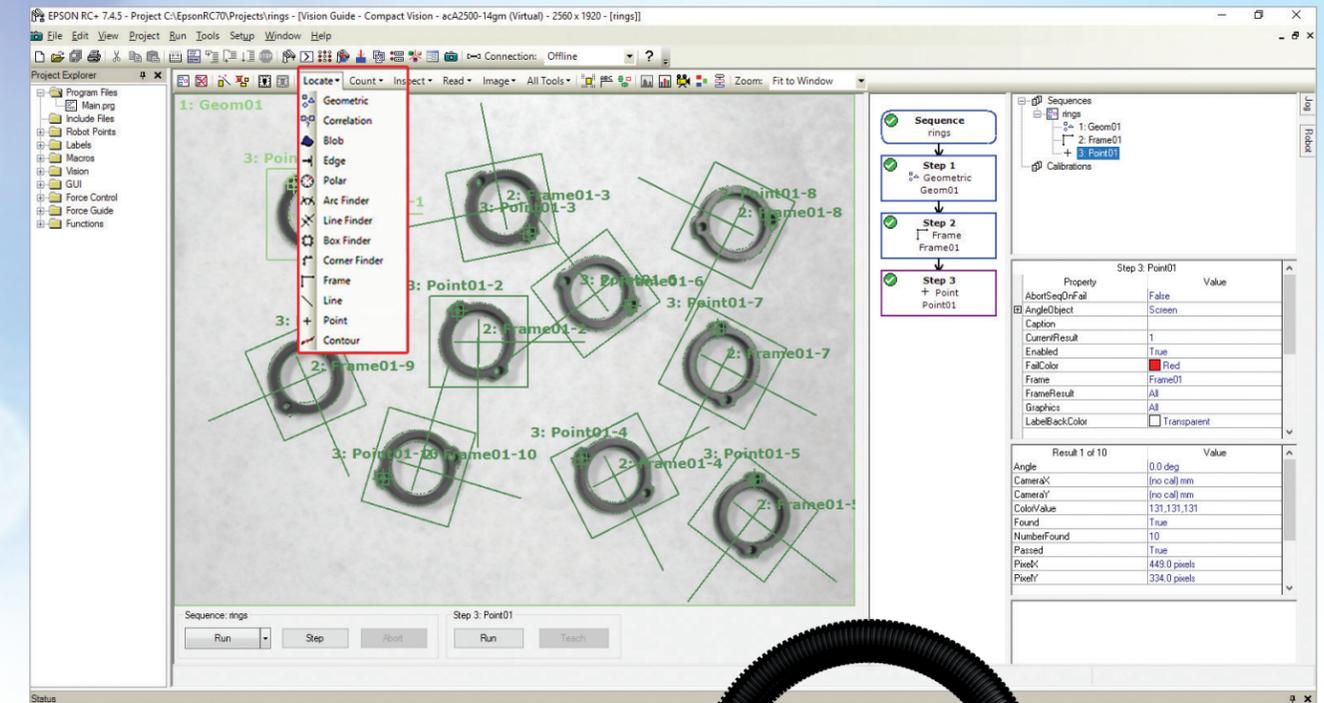
- Makes precision robotic guidance easy to set up
- Fully integrated within the Epson RC+ development environment for easy configuration and calibration
- Features a point-and-click interface that makes it simple for users of all levels
- Includes both fixed and mobile camera calibration

IntelliFlex™ Feeding System

- A simplistic feeding solution to accommodate a wide variety of parts
- Point-and-click interface helps reduce the typical development time required for advanced applications
- With four feeder sizes available (the IntelliFlex 80, 240, 380 and 530), the system can accommodate part sizes ranging from 3 to 150 mm

Force Guide

- Enables Epson robots to detect six axes of force with precision down to 0.001 N
- Driven by real-time servo system integration
- Delivers fast, tactile feedback to guide robots in high-precision parts placement applications
- Features a point-and-click interface with pre-configured solutions and built-in objects



Vision Guide and IntelliFlex are just two of the many integrated options available with Epson RC+.

