



Impact Tool and Control Quick Reference Guide

Impact Software Release 10.3

Settings - System Objects



General – provides program access to PPT device properties such as system time, CPU temperature, and available RAM. Also provides setup for Trigger Events, Diagnostics, Administration, Security, IP Address, and others.



Camera – provides program access and setup for camera properties such as Gain, Offset, Shutter Speed, Scan Settings, White Balance, and Calibration.



File Camera – provides program access and setup for images in the File Camera.



System Log – provides access to System Log entries and Archiving.



File Manager – provides access to files on the PPT device and the PC. Loads and Unloads files and sets them to Load on Startup.



Modbus Server – the server for PPT device communication with other Modbus devices on the network.



AB PCCC Server – the server for PPT device communication with other devices on the network using Programmable Controller Communication Commands (PCCC).



OPC Data Access – provides program access to PPT and other devices on the network through the PPT OPC Server.

Communication



Discrete Input – reads the vision device's polled input lines. The input lines are read only when the tool executes.



Discrete Output – controls the PPT vision device's outputs.



EtherNet/IP Explicit Data – receives data from other devices that communicate via EtherNet/IP protocol.



EtherNet/IP Explicit Message – creates a message for setting or requesting data on another Ethernet/IP device.



EtherNet/IP Read Implicit Assembly – reads a reserved data area (called a static assembly) on the vision device. Other EtherNet/IP devices can write data to this area.



EtherNet/IP Write Implicit Assembly – writes to a reserved data area (called a static assembly) on the vision device. Other EtherNet/IP devices can read data from this area.



Impact Send Message – sends data to an Impact Wait For Message tool.



Impact Wait For Message – waits for and receives data from the Impact Send Message tool.



Serial Port Out – sends a string out the vision device's serial port.



TCP/IP Out – sends a string out the vision device's Ethernet port.

Device Control



Camera Trigger – snaps a camera image and allows the configuration of one to three strobe widths and a new image ID. Original settings may be restored after the tool runs, if desired.



Device Settings – sets camera and strobe settings on the vision device when the tool executes.



Offline – places the currently connected vision device offline. If the device is already offline, no action is taken.



Online – places the currently connected vision device online. If the device is already online, no action is taken.



Vision Program Load – loads the named vision program file into vision device memory.



Vision Program Save – saves a vision program using a different program file name and task name.



Vision Program Unload – unloads the named program from the vision device. If the program is not currently loaded, no action will be taken.

Flaw Detection



Adaptive Template – matches greyscale gradients of the inspected image and the trained image and creates an output image.



Average Intensity – measures the intensity of pixels within one or more ROIs. Average greyscale levels are compared to tolerances to determine ROI and tool pass or fail.



Blob – finds randomly oriented or amorphously shaped objects in the image and provides a blob list output.



Bump Find – finds bulges in polygon boundaries which indicate defects.



Color Blob – finds randomly oriented or amorphously shaped colored objects within a user-defined color range.



Contrast – checks the pixels within an ROI and provides the percentage or area of pixels that are outside and inside a range based on user-defined parameters.



Contrast-Multiple ROI – checks the pixels within multiple ROIs and provides the percentage or area of pixels that are outside and inside a range based on user-defined parameters.



Extreme Difference – detects areas that are brighter or darker than the background.



Greyscale Template – creates a template of an image then compares that template to the snapped image. A “difference blob” is created from the differences between the template and the inspected image.



Polygon Smoothing – smoothes jagged polygon boundary edges caused by pixilation from image noise and blob thresholds. Use this tool for preprocessing before using boundary analysis tools.

Feature Finding



Average Gradient – measures edge sharpness within an ROI. The higher the gradient, the more sharply focused the edge. The output value is between 0 and 100.



Average Intensity – measures the intensity of pixels within one or more ROIs. Average greyscale levels are compared to tolerances to determine ROI and tool pass or fail.



Blob – finds randomly oriented or amorphously shaped objects in the image and provides a blob list output.



Blob Filter – filters a list of blobs from the Blob Tool for features such as size and shape.



Color Blob – finds randomly oriented or amorphously shaped colored objects within a color range.



Color Checker – compares an image color with a trained color and provides a color difference value



Contrast – checks the pixels within an ROI and provides the percentage or area of pixels that are outside and inside a range based on user-defined parameters.



Contrast-Multiple ROI – checks the pixels within multiple ROIs and provides the percentage or area of pixels that are outside and inside a range based on user-defined parameters.



Edge Point Find – finds edges along a Line ROI.



Line Find – locates a line along an edge and reports the line length and angle along with straightness and gap lengths



Spot Find – finds the maximum or minimum average greyscale level within a user-defined area in an image then locates objects or features by detecting uniformly bright or dark objects.



Wide Edge Point Find – finds edges along a wide line ROI.

Image Filtering



Average Filter – smoothes the average pixel greyscale level values in an image and provides that processed image as an output. The smoothing is done within a defined filter area of pixels that is moved progressively throughout the ROI.



Binary Image Filter – creates a binary (black and white) output image from an input image with varying greyscale level values.



Edge Enhancement – enhances edges within an image to produce an output.



Gaussian Filter – filters pixel greyscale levels within an ROI to smooth an image. A filter area is defined and used to sequentially process an area that size within the ROI. Pixels at the center of the filter area are weighted more than those further away (a Gaussian curve).

Image Filtering



Image Math – performs up to ten image math operations like AND, OR, and Subtract on the pixel greyscale level values in two images to produce an output image of the operation results.



Light Leveling – corrects for uneven lighting in an image by applying an average greyscale level calculated from a user-defined area.



Linear Morphology Close – removes small noise from an image, like the Morphology Close tool, but this tool retains thin lines in the image during the process.



Linear Morphology Open – removes small noise in an image, like the Morphology Open tool, but this tool keeps thin lines in the image during the process.



Median Filter – removes random noise from an image. The edges are not softened like the Gaussian filter. This tool is slower than the Gaussian and Average filters.



Morphology Close – performs a morphological close (dilate followed by erode) operation on the white parts of an image. This makes it useful for removing small black noise from an image or to connect white areas together.



Morphology Dilate – performs a standard dilation operation on the white parts of an image.



Morphology Erode – performs a standard erosion operation on the white parts of an image.



Morphology Open – performs a morphological open (erode follow by dilate) operation on the white parts of an image. It uses a 3x3 pixel operation and 8-connectedness.



New Image – creates a new image of a specified size and fills it with a specified greyscale level.



Pixel Fill – fills portions of a greyscale image with a specified greyscale level.

Image Geometry



Color Image Sampling – samples user-defined number of pixels in a color image to provide a reduced resolution image.



Deslant Image – corrects the slant frequently seen with dot matrix printed characters. Primarily used with the OCR tool.



Image Sampling – produces a reduced resolution image by sampling a user-defined number of pixels. For example, you can produce an image of one-half resolution by sampling every other pixel.



Image Stitching with Origins – combines (stitches) several smaller images into one large image using the images' origins. For example, you can take several images of sections of a large connector and stitch them together to produce and inspect the whole connector image.



Image Stitching with Points – combines (stitches) several smaller images into one large image using a list of common points. For example, if you have a large connector you can take several images of it and stitch them together to inspect the whole connector.

Image Geometry



Line Profile – provides a list of the greyscale values of pixels along a Line ROI.



Multiple Image Stitch – semi-automatically combines (stitches) any number of images into one large image.



Undistort Image – removes perspective and radial distortion from an image. Removing distortion should only be necessary for tools that use pixel-level models (Correlation Pattern Find, Greyscale Template, and OCR).



Unwrap – unwraps a curved image within an arc-shaped region for OCR processing.



X-Y Projection – finds the average intensity of the X or Y ROI dimension and “magnifies” it for viewing, editing, or image processing.

Locating



Blob – finds randomly oriented or amorphously shaped objects in the image and provides a blob list output.



Circular Pattern Find – reports the rotational origin of rotating objects, such as coins or snap rings, using a search model and region.



Contour Pattern Find – creates a model based on detected edges in a user-selected part of an image, then provides a best-match score and the x-y coordinates of the model’s origin as an output.



Correlation Pattern Find – finds image patterns using a general-purpose correlation based pattern find. It will find one or more instances of a predefined model image in a rectangular search region. It can find the model at any angle of rotation.



Line Find – locates a line along an edge and reports the line length and angle along with straightness and gap lengths



Origin – uses from one to three line ROIs to locate an area on an image. This origin can be linked to other tools for image orientation.



Pinpoint Pattern Find™ – uses a train region to create a pattern and calculates best-match scores and one or more origin outputs.

Logic



Basic – performs logical and mathematical calculations using the Basic programming language. The program results are available for display and to link to other tools.



Branch – chooses a true or false execution path by evaluating a user-defined expression.



Break – forces an end to loop processing or aborts the task if placed outside a loop.

Logic



Call Task – runs the called task and then returns to the calling task.



Counted Loop – loops a user-specified number of times. The starting and step-increment values may also be defined.



Counter – increments a count value then resets at a user-defined count limit.



Data Instance – The inputs and outputs of this tool vary depending on the data type selected and each data type has a specific set of data. Use the Data Instance tool if you want to access the data elements of another tool individually.



Data Set – accesses data elements of a tool and “pushes” this data to other tools.



Delay – delays task execution a user-defined number of milliseconds.



Event Scheduler – provides a user-definable delay period prior to initiating a system event. That event can then be used to trigger a task.



Group – provides a way to group and organize tools. Group tools may be placed within Group tools.



List Loop – loops through elements of a list to provide access to each element in the list.



List Sorter – sorts elements of a list into a user-defined order.



Multiple Branch – chooses multiple true or false execution paths based on the evaluation of a user-defined expression.



Pass Fail – chooses a true or false execution path based on the pass or fail status of tools.



Reset – Resets another tool’s pass, fail, or run counts when it runs.

Measurement



Angle – locates lines and measures the angle between them.



Circle Edge Refinement – locates a curved edge.



Circle Gauge – finds and measures a circle by searching along a radius for edge points and then finding the best fit circle to those points.



Line Find – locates a line along an edge and reports the line length and angle along with straightness and gap lengths



Line Gauge – finds the distance between two points using a single line ROI.

Measurement



Line Gauge Datum Line – finds the distance between a point and a line using a single line ROI.



Line Gauge Dual ROI – finds the distance between two points using two line ROIs.



Linear Regression – creates a line from a list of points. Points that lie too far from the line can optionally be ignored.



Midpoint – calculates the midpoint between two input points and provides its x-y coordinates as an output.



Multiple Point to Point Measurement – measures the distance between multiple points in a point list.



Peak Valley Find – locates and counts direction changes along the edge of an object.



Point Match – compares a list of ideal points with a list of input points and provides a list of extra and missing points.



Point-to-Line Measurement – measures the distance between a point and a line.



Point-to-Point Measurement – measures the distance between two points.



Subpixel Edge Extractor – finds the edge points along the edge of an arbitrary shape using subpixel accuracy.

Readers



Barcode – decodes UPC-style barcodes.



Character Contour Match – measures character defects by comparing an imaged character to a trained model.



Data Matrix – reads ECC 200 Data Matrix symbols. It can read all six AIM specified encoding schemes and all thirty data matrix sizes, including rectangles.



OCR – reads characters or patterns by finding the best matching character from a trained library or string, within a minimum match score. If the tool finds no matching character, a user-defined substitution character is substituted.

Specialized



Change Image Calibration – replaces the calibration data of an image with calibration data that is stored in the tool.



Clip ROI – clips the Region Of Interest to insure that it remains on the screen.



Data Transfer – “pushes” data to CPM control panels. Multiple data elements of any type may be defined and/or linked into the tool. All data is sent to the control panels each time the tool runs.

Specialized

Grid Statistics – provides extensive statistics about a series of points in a grid pattern.



Lead Statistics – provides extensive statistics about the pitch, width, and length of part leads.



Train – Trains another tool when it runs. Provides a way to train a tool from a control panel.

Images



Histogram – displays the histogram of an ROI's greyscale values.



Image Display – displays an image linked from a VPM task. The image may be from a file or real camera.



Arc ROI – displays an Arc ROI on the displayed image.



Blob List – displays a list of Blob ROIs on the displayed image.



Contour Model – displays a Contour Model ROI on the displayed image.



Correlation Model – displays a Correlation Pattern ROI on the displayed image.



Greyscale Template Model – displays a Greyscale Template ROI on the displayed image.



Line List – displays multiple line ROIs on the displayed image.



Line ROI – displays a Line ROI on the displayed image.



Origin – displays an Origin ROI on the displayed image.



Origin List – displays an Origin List ROI on the displayed image.



Point List – displays a Point List ROI on the displayed image.



Rectangle List – displays a Rectangle List ROI on the displayed image.



Rectangle ROI – displays a Rectangle ROI on the displayed image.



Shape List – displays a Shape List ROI on the displayed image.

Input



Button – produces an action event when clicked. This event can be linked to another control or a VPM tool to cause an action.



Check Box – produces a variety of events when selected or unselected. The event can be linked to another control or a VPM tool to cause an action.



Drop List Selector – allow you to select an item from a list. For example, from a list of pre-defined or linked VPM tool inspection parameters.



Font Library – displays and manipulates the VPM OCR tool's font library.

Input



Character Contour Library – displays and manipulates the VPM Character Contour Match tool's verification library.



Keyboard – displays a graphical keyboard for text and number entry on a touch screen monitor.



Numeric Entry – lets you enter integer or real numbers on the control panel. These values can be linked to VPM tools or other controls.



Password – defines a User ID and password to limit access to controls and control panels. For example, this control's Logged On property can be linked to another control's Visible or Enabled property to limit access to it.



Radio Button – makes choices on a control panel. When two or more radio buttons are in a group, selection is automatically limited to one button at a time.



Radio Button Group – groups Radio Buttons so selection is automatically limited to one button in the group at a time.



Range – allows you to enter the start and end values of a Range1D and Tolerance input data types in a VPM tool.



Range Scroll – displays and adjusts a range of values with a scroll bar. For use with VPM tools that have a Range1D data type.



Slider – varies a value when a slider is moved on the control panel. You can define the size, orientation, and major and minor tick spacing for the best presentation.



Table – displays and/or edits a two-dimensional table of data.



Text Entry – enters text on the control panel. The entered text can then be linked to a vision program or another control panel.



Toggle Button – changes state from Selected to Unselected each time it's pressed.



Tolerance – displays and adjusts tolerance values with a step button. For use with VPM tools that have a Tolerance data type.

Display



Chart – creates five different types of charts to display inspection result values on a control panel.



Frame – groups controls in the Control Panel Tree and the Control Panel. This allows you to move and set some of the properties of all the controls within the Frame at one time.



Graphic Display – displays a graphic image on a control panel. For instance, you could display a company logo or an icon that represents an operation or machine.



Indicator Light – shows a user-defined color indication of its current state. Use this control to indicate other control's current status.



Numeric Display – displays numbers on the control panel.

Display



Rich Text – displays formatted text on the control panel. You can format text (including font type and size), change the text pane color, and insert images.



Scrolling Table – displays user defined controls in grid format where only one row or column is updated and extra rows or columns are scrolled off the table when new ones are added.



Tab – when used with the Tab Group control, combines controls into an area that is selectable by the operator. The Tab Group control must be selected in the Control Palette to add this control.



Tab Group – when used with the Tab control, combines controls into an area that is selectable by the operator.



Text Display – displays text on the control panel.



Xbar-R Chart –graphs statistical information on the control panel. It will show both the mean value (Xbar) and the range \bar{R} of a data set.

General



Basic Interpreter – performs logical and mathematical calculations based on a set of user-written statements using the Basic programming language. The program results are available to link to other controls.



Execute Command – executes a system command. For example, you can run another application from the control panel.



Impact Connector – connects the control panel to a PPT device. Vision programs, tasks, and tool data are linked to this control, then linked to properties, methods, and events in other controls.



Load Image – loads an image from a file on the client into an Image Display control.



Load Vision Program – loads a vision program file onto the connected PPT device.



Save Vision Program – saves a loaded vision program file on the connected PPT device.



Scriptor – used to write Java-based control panel commands and apply them to a running control panel application.



TCP-IP Logger – receives data from a vision program TCP/IP Out tool and writes it to a text file.



Timer – counts elapsed time during Run mode. It can be set to repeat the time interval.