

## ActiveMIL Control Listing and Description

This section provides an overview of each ActiveMIL control and a brief description of most ActiveMIL command control-actions (methods), control-generated episodes (events) and control-states (properties). Note that this represents only a partial list of available commands. For a complete description of the syntax and the use of each command, refer to the ActiveMIL On-line Control Reference manual.

### Application control

Used to initialize and control the ActiveMIL application environment. The Application control includes control of integrated debugging features, system resource compensation, command threads and related events, as well as a timer function. On-board thread use is also controlled by the Application control.

Properties	Description
AvailableSystems	Returns the collection of systems that are available for use in a PC and are accessible to the Application control.
MemoryCompensation	Returns or sets whether on-board memory compensation on the Host is enabled.
NonPagedMemory	Allows you to determine the non-paged memory (DMA) settings of the application.
ProcessingCompensation	Returns or sets whether on-board processing compensation on the Host is enabled.
ResultsValidation	Returns or sets whether results validation is enabled when using an analysis control's Results.Get method.
Timer	Allows you to manipulate the high-resolution timer of the application.

### System control

Used to control the ActiveMIL system (frame grabber boards, vision processor boards, or host system).

Events	Description
SerialPortData	Occurs when data is received on a serial port.
System.ControlUserBits	Controls the specified setting for the specified user-defined signal.
System.InquireUserBits	Returns the value of a specified setting for a specified user-defined signal.
UserBitChanged	Occurs when the state of a user bit changes in accordance with its specified interrupt mode (edge rising or falling).

Methods	Description
ControlUserBits	Controls the specified setting for the specified user-defined signal.
InquireUserBits	Returns the value of a specified setting for a specified user-defined signal.
ShowPropertyPages	Opens the specified property pages of the System control in a window.

Properties	Description
DeviceNumber	Returns or sets the device number (or rank) of the System control.
GrabInDisplay	Allows you to specify or determine the interaction between the digitizer and the display during a displayed grab operation.
NumberOfCRTControllers	Returns the number of CRT controllers available in a system.
NumberOfDigitizers	Returns the number of digitizers available in a system.
NumberOfProcessors	Returns the number of processors available in a system.
SerialPorts	Returns the collection of serial ports available to the System control, allowing access to each of its elements.
SystemDescriptor	Returns or sets the descriptor of the system to allocate.
SystemType	Returns or sets the type of system.
UserBits	Allows you to specify or determine the auxiliary I/O pins on the Matrox 4Sight/4Sight-II platform.
Watchdog	Allows you to specify or determine the settings of the Watchdog.

## BlobAnalysis control

Used to identify and measure connected components (blobs) in an image.

Methods	Description
ApplyFilter	Applies a filter that specifies the blobs to include, exclude or delete permanently from the blob results.
Calculate	Identifies the blobs in an image and calculates selected features.
EraseBorderBlobs	Copies all blobs that do not touch the borders of the source image into the destination image.
ExtractHoles	Copies all holes within blobs from the source image to the destination image.
FillHoles	Copies all blobs from the source image into the destination image and fills blob holes.
LabelImage	Labels each included blob with its own unique label.
Reconstruct	Copies all blobs, from the source image, that have at least one corresponding non-zero seed pixel in the seed image to the destination image.
Results.Draw	Draw specific features of the blob analysis results in the destination image.
ShowPropertyPages	Opens the specified property pages of the BlobAnalysis control in a window.
Properties	Description
FeatureList	Allows you to select features for calculation (see list below).
Filters	A collection that allows blob results to be filtered in or out of the results collection depending on calculated feature values.
Results	Returns the collection of results calculated for the BlobAnalysis control, allowing access to its properties. (See list)
SortingKeys	A collection of sorting keys that allow blob results to be sorted depending on a calculated feature values.
Events	Description
ResultsModified	Occurs after results have been modified.

## Blob features and results

For the BlobAnalysis control, the result(s) and feature(s) that can be calculated include(s):

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### Features

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Area	MaximumFerretAngle
Box	MaximumFerretDiameter
Breadth	MaximumPixelValue
CenterofGravity	MeanFerretDiameter
CentralMovementX0Y2	MeanPixelValue
CentralMovementX1Y1	MinimumFerretAngle
CentralMovementX2Y0	MinimumFerretDiameter
Chains	MinimumPixelValue
Compactness	MomentX2Y0
ContactPoints	MomentX1Y1
ConvexPerimeter	MomentX1Y0
Elongation	MomentX0Y2
EulerNumber	MomentX0Y1
FeretElongation	NumberofHoles
FirstPointX	Perimeter
FirstPointY	PrincipleAxisAngle
GeneralFeret	Roughness
GeneralMoment	Runs
Intercept0	SecondaryAxisAngle
Intercept45	SigmaOfPixelValues
Intercept90	SumOfPixelValues
Intercept135	SumOfSquaredPixelValues
Length	

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### Results

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Area	Intercept90
BoxXMaximum	Intercept135
BoxXMinimum	LabelValue
BoxYMaximum	Length
BoxYMinimum	MaximumFerretAngle
Breadth	MaximumFerretDiameter
CenterOfGravityX	MaximumPixelValue
CenterOfGravityXGrayscale	MinimumFerretDiameter
CenterOfGravityY	MeanFerretDiameter
CenterOfGravityYGrayscale	MeanPixelValue
CentralMomentX0Y2	MinimumFerretAngle
CentralMomentX0Y2Grayscale	MinimumFerretDiameter
CentralMomentX1Y1	MinimumPixelValue
CentralMomentX1Y1Grayscale	MomentX0Y1
CentralMomentX2Y0	MomentX0Y1Grayscale
CentralMomentX2Y0Grayscale	MomentX0Y2
Chains	MomentX0Y2Grayscale
Compactness	MomentX1Y0
ContactPointXMaximumAtYMaximum	MomentX1Y0Grayscale
ContactPointXMinimumAtYMinimum	MomentX1Y1
ContactPointYMaximumAtXMaximum	MomentX1Y1Grayscale
ContactPointYMinimumAtXMinimum	MomentX2Y0
ConvexPerimeter	MomentX2Y0Grayscale
Elongation	NumberofHoles
EulerNumber	Perimeter
FeretElongation	PrincipleAxisAngle
FeretX	PrincipleAxisAngleGrayscale
FeretY	Roughness
FirstPointX	Runs
FirstPointY	SecondaryAxisAngle
GeneralFeret	SecondaryAxisAngleGrayscale
GeneralMoment	SigmaOfPixelValues
GeneralMomentGrayscale	SumOfPixelValues
Intercept0	SumOfSquaredPixelValues
Intercept45	

## Calibration control

Used to convert coordinates or measurements from pixel to real-world units, as well as to correct distortions in an image.

Methods	Description
CalibrateGrid	Calibrates your imaging setup using a grid.
CalibratePoints	Calibrates your imaging setup using a list of coordinates.
ConvertCoordinatePixelToWorld	Converts a pair of coordinates from their pixel value to their world value.
ConvertCoordinateWorldToPixel	Converts a pair of coordinates from their world value to their pixel value.
ConvertResultPixelToWorld	Converts a non-positional result (length, area, or angle) from its pixel value to its world value.
ConvertResultWorldToPixel	Converts a non-positional result (length, area, or angle) from its world value to its pixel value.
CorrectImage	Physically transforms an image to remove certain types of distortions.
Load	Loads the calibration object from a file, into the Calibration control.
LoadStream	Loads the settings of a previously saved Calibration control from a file or memory.
Save	Saves the calibration object in a file.
SaveStream	Saves the settings of a Calibration control to a specified file or memory.
ShowPropertyPages	Opens the specified property pages of the Calibration control in a window.

Properties	Description
CalibrationPoints	Returns the collection of calibration points of the Calibration control, allowing access to the collection's elements.
CalibrationMode	Returns or sets the calibration mode (i.e. Linear Interpolation, Perspective Transformation).
CameraPosition	Allows you to specify or determine the position of the camera relative to the absolute coordinate system.
Grid	Allows you to specify or determine the calibration grid attributes.
OutputCoordinateSystem	Returns or sets the output coordinate system in which to return results from operations on calibrated images.
RelativeOrigin	Allows you to specify or determine the origin and/or orientation of the relative coordinate system.
Results	Allows you to obtain pixel characteristics results from a Calibrated control.
TransformCacheEnabled	Returns or sets whether to enable or disable a cache to accelerate the CorrectImage method.

Events	Description
ResultsModified	Occurs after results have been modified.

## CharacterRecognition control

Template-based character recognition control that includes character font definition, as well as font archiving and retrieving.

Methods	Description
CalibrateFont	Calibrates the font's character size to match the dimensions of the specified sample image.
ConvertOCRType	Converts the search algorithm used by the CharacterRecognition control from one type to the other.
Load	Loads the font from a file, into the CharacterRecognition control.
Preprocess	Preprocesses the CharacterRecognition control.
ReadString	Reads a string from the target image.
Save	Saves the font data in a file.
ShowPropertyPages	Opens the specified property pages of the Character Recognition control in a window.
VerifyString	Verifies that a known string is present in the image.

Properties	Description
AcceptanceThreshold	Returns or sets the minimum acceptance level for an entire string to be accepted during a read or verify operation.
Constraints	Returns the collection of constraints available to the CharacterRecognition control, allowing access to its elements.
ContrastEnhancement	Returns or sets whether the contrast enhancement step is performed during read or verify operations.
EnableBlankCharacters	Returns or sets whether blank characters should be found in the string.
EnableBrokenCharacters	Returns or sets whether broken characters can be read/verified.
EnableTouchingCharacters	Returns or sets whether touching characters can be read/verified.
Font	Allows you to specify or determine the characteristics of the font.
ForegroundPixelValue	Returns or sets whether the characters are brighter or darker than the background.
MaximumStringLength	Returns or sets the maximum length of the string to be read or verified.
NumberOfStrings	Returns or sets the number of strings to be found in the target image.
Results	Allows you to obtain the results of the last read or verify operation.
SearchAngle	Allows you to specify or determine the CharacterRecognition control's angular search range.
SearchRegion	Allows you to specify or determine the region of interest in which to search for the string.
Speed	Returns or sets the speed factor.
StringLocation	Returns or sets whether the string location step is performed during read or verify operations.
StringType	Returns or sets the type of font being defined.
TargetCharacter	Allows you to specify or determine the characteristics of the font characters.

Events	Description
ResultsModified	Occurs after results have been modified.
ValidateString	Occurs after a read or verify operation.

## Code control

Used to read (and write) various 1D and 2D code symbologies.

Methods	Description
CalculateCodeSize	Get the minimum X and Y size required for the destination image of a write operation.
Load	Loads the code from a file into the Code control.
LoadStream	Loads the settings of a previously saved Code control from a file or memory.
ReadCode	Read the specified type of code in an image.
Save	Saves the code data into a file.
SaveStream	Saves the settings of a Code control to a specified file or memory.
ShowPropertyPages	Opens the specified property pages of the Code control in a window.
VerifyCode	Computes the different quality grades of the code included in the specified source image.
WriteCode	Encode an ASCII string into an image.

Properties	Description
CodeType	Returns or sets the type of code to read or write (see list below).
EncodingType	Returns or sets the encoding type (see list below).
ErrorCorrectionType	Returns or sets the type of error correction (see list below).
Results	Allows you to obtain results from the last read or write operation.
SearchRegion	Allows you to specify the region of the image in which to search for the code.
TargetGrid	Allows you to specify read or write boundaries, in order to improve robustness.

Events	Description
ResultsModified	Occurs after results have been modified.

## 1D and 2D code symbologies

For the respective methods, the code type(s) that can be read or written include(s):

Code Types	Encoding Types	Error Correction
BC412	Standard encoding type	No error correction
Codabar	Standard encoding type	No error correction
Code39	ASCII encoding, Standard encoding type	No error correction; check-digit error correction
Code93	ASCII encoding	Check-digit error correction
Code128 (UCC/EAN128)	ASCII encoding	Check-digit error correction
DataMatrix	Numeric encoding, Alpha encoding, AlphaNumericPunc encoding, AlphaNumeric encoding, ASCII encoding, IS08 encoding	10, 40, 50, 60, 70, 80,90, 100, 110, 120, 130, 140 or 200 error correction
EAN8	Numeric encoding	Check-digit error correction
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**Code control (continued)****1D and 2D code symbologies**

For the respective methods, the code type(s) that can be read or written include(s):

Code Types	Encoding Types	Error Correction
EAN13	Numeric encoding	Check-digit error correction
Interleaved 2/5	Numeric encoding	No error correction; check-digit error correction
Maxicode	Encoding mode 2, 3, 4, 5, 6	Reed Solomon error correction
MicroPDF417	Standard encoding type	Reed Solomon error correction
PDF417 (2D)	Standard encoding type	Reed Solomon 1 - 8 error correction
Pharma code	Numeric encoding	No error correction
Planet code	Numeric encoding	Check-digit error correction
Postnet code	Numeric encoding	Check-digit error correction
QR	QR code Model 1, 2 encoding	Lowest-level QR, Low-level QR, High-level QR, Highest-level QR
RSS	RSS 14, RSS 14 Stacked, RSS 14 Stacked Omni, RSS 14 Truncated, RSS Expanded, RSS Expanded Stacked, RSS Limited encoding.	Check-digit error correction
UPC-A	Numeric encoding	Check-digit error correction
UPC-E	Numeric encoding	Check-digit error correction

**Composite code symbologies**

This code type is a composite of a 1D (RSS, UPC-A, UPC-E, EAN-8, EAN-13, or UCC/EAN128) and a 2D code type (PDF417 or MicroPDF417).

## Digitizer control

Used to initialize and control a digitizer (image capture device), which includes capture mode (trigger, frame/field, blocking/non-blocking), image scaling and cropping, input channel, input LUT, analog settings (references, hue, saturation, and brightness) as well as events for callback functions.

Methods	Description
Focus	Adjusts the camera's lens motor to a position which provides optimum focus.
Grab	Grabs data from an input device into an image.
GrabContinuous	Grabs data continuously from an input device.
GrabWait	Waits for the end of the grab in progress.
Halt	Halts a continuous grab from an input device.
SendTrigger	Sends a software trigger to the specified digitizer if its trigger source is set to software.
ShowPropertyPages	Opens the specified property pages of the Digitizer control in a window.

Properties	Description
BlackReference	Returns or sets the digitization black reference level.
Brightness	Returns or sets the digitization brightness reference level for composite input video signals.
Bayer	Allows you to specify or determine the digitizer's Bayer properties.
Calibration	Returns or sets the Calibration control to associate with the digitizer.
Channel	Returns or sets the active input channel of the digitizer.
Contrast	Returns or sets the contrast reference level of a composite input video signal.
Exposure1(2)Format	Returns or sets the state of TTL or RS-422/LVDS transmitters for the exposure signal generated by timer1 or 2.
Exposure1(2)Mode	Returns or sets the active level of the exposure signal generated by timer1 or 2.
Exposure1(2)Source	Returns or sets the trigger source for timer1 or 2.
Exposure1(2)Time	Returns or sets the grab exposure time, or the active time of timer1 or 2.
Exposure1(2)TimeDelay	Returns or sets the delay between the trigger event and the start of exposure, or sets the inactive time of timer1 or 2.
Format	Returns or sets the digitizer configuration format of the specified digitizer.
InputRegion	Allows you to specify or determine the digitizer's input region.
LUT	Allows you to specify or determine the digitizer's custom LUT.
MultipleBuffering	Allows you to build a multiple buffering application.
SerialPort	Allows you to specify or determine the digitizer's serial port properties.
SynchronizeOnGrabEnd	Returns or sets a second digitizer with which to synchronize the digitizer, so that the two digitizers grab consecutively.
TriggerEnabled	Returns or sets whether a grab should wait for a trigger.
TriggerMode	Returns or sets the hardware grab trigger activation mode.
TriggerSource	Returns or sets the signal source of the grab trigger.
UserBits	Allows you to specify or determine the state of the user-defined signals.
WhiteReference	Returns or sets the digitization white reference level.



## Digitizer control (continued)

Events	Description
CameraPresent	Occurs at the start of the incoming signal's fields.
FieldStart	Occurs at the start of the incoming signal's fields.
FieldStartEven	Occurs at the start of the incoming signal's even fields.
FieldStartOdd	Occurs at the start of the incoming signal's odd fields.
FrameStart	Occurs at the start of each grabbed or displayed frame.
GrabEnd	Occurs at the end of grab.
GrabFieldEnd	Occurs at the end of each grabbed field.
GrabFieldEndEven	Occurs at the end of each grabbed even field.
GrabFieldEndOdd	Occurs at the end of each grabbed odd field.
GrabFrameEnd	Occurs at the end of each grabbed frame.
GrabFrameStart	Occurs at the start of each grabbed frame.
GrabLine	Occurs when the specified line number is reached.
GrabLineEnd	Occurs when the data of the specified line number is in the buffer and ready to be processed.
GrabStart	Occurs at the start of grab.
MoveLens	Occurs after each new focus position determined by the Focus method.
ProcessModifiedImage	Occurs when an image, in the array of Image controls passed to the MultipleBuffering.Process method, is modified.
SerialPortData	Occurs when data is received on the digitizer's serial port.
UserBitChanged	Occurs when the user-defined signal generates an interrupt upon a rising edge.

## Display control

Used to initialize and control an image display, which includes image display windows, graphics overlay, output LUT, image pan, scroll, and zoom.

Methods	Description
ClearOverlay	Returns or sets the value to which the overlay image associated with the display should be cleared.
Pan	Pans and scrolls the specified display.
ShowPropertyPages	Opens the specified property pages of the Display control in a window.
Zoom	Magnifies or reduces the view of the image being displayed.

Properties	Description
CenterDisplay	Returns or sets whether the image selected to the display will be centered in the display.
ExternalWindow	The external window is a display window, created and managed by ActiveMIL, that allows panning and zooming via scrollbars and buttons.
FillDisplay	Returns or sets whether the display will be filled with the selected image using an automatically calculated zoom factor.
LUT	Allows you to specify or determine the display's custom LUT.
OverlayImage	Allows you access to the overlay image associated with the display.
OverlayKeyColor	Returns or sets the keying color for overlay.

Events	Description
Click	Occurs when the user clicks any mouse button.
DbtClick	Occurs when the user double-clicks the left mouse button.
FrameStart	Occurs at the start of each displayed frame.
KeyDown	Occurs when the user presses a key.
KeyPress	Occurs when the user presses and releases an ANSI key.
KeyUp	Occurs when the user releases a key.
MouseDown	Occurs when the user clicks a mouse button.
MouseMove	Occurs when the user moves the mouse.
MouseUp	Occurs when the user releases a mouse button.
Paint	When a section of the display object needs repainting.
ScrollHorizontal	Occurs when the content of the display changes in a manner that requires the horizontal scroll bar values to be adjusted.
ScrollVertical	Occurs when the content of the display changes in a manner that requires the vertical scroll bar values to be adjusted.
Zoom	Occurs after the display window has been zoomed.

## EdgeFinder control

Used to extract and analyze object contours or thin curvilinear features.

Methods	Description
ApplyFilter	Applies a filter that specifies the edges to include, exclude or delete permanently from the edge results.
Calculate	Extracts the edges from an image and calculates selected features.
CalculateFromResult	Calculates selected features from the result of each edge found to accelerate the search time.
Draw	Draws specified edge feature in the destination image.
Load	Loads a previously saved EdgeFinder control from a file.
LoadStream	Loads the settings of a previously saved EdgeFinder control from a file or memory.
Mask	Masks the source image or edge results using the specified mask image.
PutEdgeResults	Puts edge chains from user-supplied arrays into the results of an EdgeFinder control.
Results.CalculateStat	Calculates the statistics of a characteristic of an edge or of all edges in the results of an EdgeFinder control.
Results.Draw	Draws the specified results, calculated for the edge in the destination image.
Save	Saves the settings of the EdgeFinder control to disk.
SaveStream	Saves the settings of a EdgeFinder control to a specified file or memory.
ShowPropertyPages	Opens the specified property pages of the EdgeFinder control in a window.

Properties	Description
Accuracy	Returns or sets the edgel accuracy required for the edge extraction.
DrawingParameters	Allows you to specify or determine the characteristics of the drawing parameters, such as scale factor to be used when drawing edgels with sub-pixel accuracy.
ExtractionFilter	Allows you to specify or determine the filter settings used to perform the edge extraction.
FeatureList	Allows you to select features for calculation (see list).
FillGapParameters	Allows you to specify or determine the characteristics of the gap filling parameters.
Filters	A collection that allows EdgeFinder results to be filtered in or out of the results collection depending on calculated feature values.
ImageFeature	Allows you to specify or determine which image feature(s) are selected for saving.
ModelFinderCompatible	Returns or sets whether the EdgeFinder control can be used with a Model Finder control as a target to be searched or as a model.
NearestNeighbors	Returns the collection of nearest neighbors available to the EdgelFinder control, allowing access to its elements.
Results	Returns the collection of results calculated for the EdgeFinder control, allowing access to its properties (see list).
SortingKeys	A collection of sorting keys that allow EdgeFinder results to be sorted depending on a calculated feature values.
SourceDerivativeImages	Allows you to specify or determine the derivative images containing the edges to extract.
Threshold	Allows you to specify or determine the threshold settings used to perform the edge extraction.

Events	Description
ResultsModified	Occurs after results have been modified.

## EdgeFinder features and results

For the EdgeFinder control, the feature(s) and result(s) that can be calculated include(s):

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### Features

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AverageStrength, Box, CenterOfGravity, CircleFit, Closure, ContactPoints, ConvexPerimeter, EdgelAngle, EdgelMagnitude, EllipseFit, FastLength, FeretElongation, FirstPoint, GeneralFeret,	LabelValue, Length, LineFit, MaximumFeretAngle, MaximumFeretDiameter, MeanFeretDiameter, MinimumFeretAngle, MinimumFeretDiameter, MomentElongation, MomentElongationAngle, Position, Size, Strength, Tortuosity
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### Results

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AngleImage, AverageStrength, BoxXMaximum, BoxXMinimum, BoxYMaximum, BoxYMinimum, CenterOfGravityX, CenterOfGravityY, CircleFitCenterX, CircleFitCenterY, CircleFitCoverage, CircleFitError, CircleFitRadius, Closure, ContactPointXMaximumAtYMaximum, ContactPointXMinimumAtYMinimum, ContactPointYMaximumAtXMinimum, ContactPointYMinimumAtXMaximum, ConvexPerimeter, CrossDerivativeImage, Edgels, EllipseFitCenterX, EllipseFitCenterY, EllipseFitCoverage, EllipseFitError, EllipseFitMajorAxis, EllipseFitMinorAxis, FastLength, FeretElongation, FeretX, FeretY, FirstDerivativeXImage, FirstDerivativeYImage, FirstPointX,	FirstPointY, GeneralFeret, GeneralFeretFirstEdgelIndex, GeneralFeretSecondEdgelIndex, LabelValue, Length, LineFitA, LineFitB, LineFitC, LineFitError, MagnitudelImage, MaximumFeretAngle, MaximumFeretDiameter, MaximumFeretFirstEdgelIndex, MaximumFeretSecondEdgelIndex, MeanFeretDiameter, MinimumFeretAngle, MinimumFeretDiameter, MinimumFeretFirstEdgelIndex, MinimumFeretSecondEdgelIndex, MomentElongation, MomentElongationAngle, PositionX, PositionY, SecondDerivativeXImage, SecondDerivativeYImage, Size, Strength, ThresholdHighValue, ThresholdLowValue, TotalNumberOfEdgels, TotalNumberOfVertices, Tortuosity, Vertices
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### GraphicContext control

Used to create drawings and text annotations in an image. This control provides a set of graphics primitives (arc, circle, line, and rectangle), control of color (foreground, background, fill) and text (font, color, size).

Methods	Description
Arc	Draws an arc.
Cross	Draws a cross, at any angle.
Dots	Draw one or more single-pixel dots.
Fill	Performs a boundary-type seed fill.
LineSegments	Draw one or more line segments.
Rectangle	Draws a rectangle, at any angle.
ShowPropertyPages	Opens the specified property pages of the Graphic Context control in a window.
Text	Writes text.

Properties	Description
BackgroundColor	Returns or sets the background color of the GraphicContext control.
DrawingRegion	Allows you to specify or determine the drawing region within the image.
Font	Returns or sets the type of font with which to write text.
ForegroundColor	Returns or sets the foreground color of the GraphicContext control.

### Image control

Used to allocate and control ActiveMIL images, and to generate data for a LUT and the warp function. Includes control of a child buffer (ROI), image compression and decompression, custom kernel or structuring element, and image archiving and retrieving.

Methods	Description
AssignMemory	Allocates the Image control using the memory at the specified location.
Bayer	Decode the color information from a single-band, Bayer encoded image.
Clear	Clears the image.
ChildRegion.Mode	Returns or sets the mode of operation of a child image.
Clone	Clones and returns an image identical to the specified image.
Copy	Copies data from a source image into the image.
CopyClip	Copies data from a source image, starting from the specified offset and clipping data that falls outside the image.
CopyConditional	Conditionally copies data from a source image to the image. Each image pixel is overwritten only if the corresponding pixel in the conditional image satisfies the specified condition. Other pixels are unchanged.
CopyMask	Copies data, with a bit-plane mask, from a source image to the image. Each image bit is changed only if it has a corresponding non-zero bit in the mask.
CopyRegion	Copies data from a region of a source image into the specified region of the image.
CopyToClipboard	Copies data from the current source image into the clipboard.

## Image control (continued)

Methods	Description
FileInquire	Inquire about the data in a file.
Get	Copies a region of image data into a specified user-array. This region can be contained in one band or all bands of the image.
GetLine	Reads the pixels of a theoretical line between specified coordinates, counts them, and stores them in a specified array.
Load	Loads the image from a file, using the format specified by the FileFormat property, into the Image control.
PasteFromClipboard	Pastes image data (in CF_DIB format) from the clipboard into an Image control.
Put	Puts data from a specified array into a region of the image.
PutLine	Overwrites a specified series of pixels within specified coordinates, along a theoretical line with the data in a user-array.
Save	Saves the image data into a file, using the format specified by the FileFormat property.
ShowPropertyPages	Opens the specified property pages of the Image control in a window.
Properties	Description
Calibration	Returns or sets the Calibration control to associate to the image.
ChildRegion	Allows you to specify or determine the child image's region within its parent.
CompressionType	Returns or sets the type of compression, if any, to apply to the image data.
FileFormat	Returns or sets the file format used when saving or loading the image.
Format	Returns or sets the image's internal data format.
JPEGAlgorithm	Allows you to specify or determine the parameters of the JPEG algorithm used for the compression.
JPEG2000Algorithm	Allows you to specify or determine the parameters of the JPEG2000 algorithm used for the compression.
LUT	Allows you to specify or determine the custom LUT associated with the image.
NumberOfBands	Returns or sets the number of color bands of the Image control.
SizeX, SizeY	Returns or sets the image's X or Y width.
Events	Description
ContentModified	Occurs when the content of the image is modified.

## ImageProcessing control

Used to perform filtering, morphological, point-to-point, segmentation, and statistical operations on an image. This control also includes geometric, color space, and domain transforms, as well as other image processing primitives.

Methods	Description
AbsoluteValue	Performs a point-to-point absolute value operation on an image.
Add	Performs a point-to-point addition operation using two source images.
And	Performs a point-to-point bitwise AND operation using two source images.
Binarize	Performs a point-to-point binary thresholding operation on an image.
CalculateStats	Calculates a variety of statistics on an image.
Clip	Performs a point-to-point clipping operation on an image.
Close	Performs a morphological closing operation on an image.
ConnectMap	Performs a 3x3 binary connectivity mapping operation on an image.
Convolve	Performs a custom convolution operation on an image.
Convert	Performs a color conversion operation on an image.
CountDifferences	Counts the number of pixels that differ between two images.
Dilate	Performs a morphological dilation operation on an image.
DiscreteCosineTransform	Performs a discrete cosine transform operation on an image.
Distance	Performs a distance transformation operation on an image.
Divide	Performs a point-to-point division operation using two source images.
EdgeDetect	Performs an edge detection operation and produces a gradient intensity and/or gradient angle image.
EdgeDetect1	Applies an edge detection filter, which is a fast approximation of a Sobel filter, to an image.
EdgeDetect2	Applies an edge detection filter, which is a fast approximation of a Prewitt filter, to an image.
Erode	Performs a morphological erosion operation on an image.
FastFourierTransform	Performs a fast Fourier transform operation on an image.
FindExtremes	Finds an image's extremes (minimum and/or maximum pixel values).
Flip	Performs a horizontal or vertical image-flipping operation.
Histogram	Generates the intensity histogram of an image.
HistogramEqualize	Performs a histogram equalization operation on an image or generates the LUT required to perform this operation.
HitOrMiss	Performs a morphological hit or miss transformation on an image.
HorizontalEdge	Applies a horizontal edge detection filter on an image.
Label	Labels blobs in an image.
LaplacianEdge1	Applies a Laplacian edge 1 filter on an image.
LaplacianEdge2	Applies a Laplacian edge 2 filter on an image.

## ImageProcessing control (continued)

Methods	Description
LocateEvents	Locates pixels corresponding to a specified criteria in an image.
LUTMap	Performs a point-to-point LUT mapping operation on an image
Match	Performs a morphological matching operation on an image.
Maximum	Performs a point-to-point maximum operation using two source images.
Minimum	Performs a point-to-point minimum operation using two source images.
Multiply	Performs a point-to-point multiply operation using two source images.
MultiplyAndAccumulate1	Performs a point-to-point multiply and accumulate 1 operation using the stated source images.
MultiplyAndAccumulate2	Performs a point-to-point multiply and accumulate 2 operation using the stated source images.
Nand	Performs a point-to-point NAND operation using two source images.
Negate	Performs a point-to-point negate operation on an image.
Nor	Performs a point-to-point NOR operation using two source images.
Not	Performs a point-to-point NOT operation on an image.
OffsetGain	Performs a per-pixel gain and offset correction on an image.
Open	Performs a morphological opening operation on an image.
Or	Performs a point-to-point OR operation using two source images.
PolarToRectangular	Performs a polar-to-rectangular transform.
Project	Projects a 2-D image into 1-D.
Rank	Performs a rank filter on an image.
RectangularToPolar	Performs a rectangular-to-polar transform.
Resize	Resizes an image in X and/or Y.
Rotate	Rotates an image around the specified center of rotation.
Sharpen1	Applies a sharpening filter, which places equal emphasis on all neighboring pixels.
Sharpen2	Applies a sharpening filter, which places emphasis only on horizontally and vertically touching neighbors.
Shen	Applies a Shen-Castan Infinite Support Exponential (IIR) filter on an image.
Shift	Performs a point-to-point bit shift operation on an image.
ShowPropertyPages	Opens the specified property pages of the Image Processing control in a window.
Smooth	Applies a smoothing filter on an image.
Subtract	Performs a point-to-point subtraction operation using two source images.
Thick	Thickens blobs in an image.
Thin	Thin blobs in an image.
Translate	Translates an image in X and/or Y with sub-pixel accuracy.



## ImageProcessing control (continued)

Methods	Description
VerticalEdge	Applies a vertical edge detection filter, which computes the absolute value of the vertical derivative of the image.
Warp	Warpes an image.
WarpParameters.GenerateLUT	Generates the LUT entries for a 3x3 matrix-defined warping.
WarpParameters.MapQuadrilateralToRectangle	Generates coefficients for a perspective warping that maps a quadrilateral onto a rectangle.
WarpParameters.MapRectangleToQuadrilateral	Generates coefficients for a perspective warping that maps a rectangle onto a quadrilateral.
WarpParameters.ResetCoefficients	Resets the matrix of warping coefficients.
WarpParameters.RotateCoefficients	Generates warp coefficients for a counter-clockwise rotation.
WarpParameters.ScaleCoefficients	Generates warp coefficients for a scaling.
WarpParameters.ShearCoefficients	Generates warp coefficients for a shearing.
WarpParameters.TranslateCoefficients	Generates warp coefficients for a translation.
Watershed	Performs a watershed transform on an image.
WeightedAverage	Performs a point-to-point weighted average operation on an image.
Xnor	Performs a point-to-point XNOR operation on an image.
Xor	Performs a point-to-point XOR operation on an image.
ZoneOfInfluence	Performs a zone of influence operation on an image.

  

Properties	Description
Kernels	Returns the collection of kernels available to the ImageProcessing control, allowing access to its elements.
LUTs	Returns the collection of LUTs available to the ImageProcessing control, allowing access to its elements.
PolarParameters	Allows you to specify or determine the polar parameters of the image.
Results	Returns the collection of statistical image processing results obtained by the ImageProcessing control, allowing access to the collection's elements.
StructuringElements	Returns the collection of structuring elements available to the ImageProcessing control, allowing access to its elements.
WarpParameters	Allows you to specify or determine the coefficients or LUTs used to warp an image.

  

Events	Description
ResultsModified	Occurs after results have been modified.

## Measurement control

Used to locate and measure edges or stripes within an image. Also used to take measurements between points, edges, or stripes. This control includes functions to save or restore markers (i.e., points, edges, or stripes).

Methods	Description
Calculate	Performs measurement calculations between two specified markers.
FindMarker	Finds an edge or stripe marker in the image.
Markers.Add	Adds a new marker to the Measurement Markers collection.
Markers.Item.Draw	Draws marker features in the destination image.
Markers.Item.SaveStream	Saves the characteristics of a measurement marker to a specified file or memory.
Markers.Load	Loads a marker from a file into the Measurement Markers collection.
Markers.LoadStream	Loads the characteristics of a previously saved measurement marker from a file or memory.
Markers.Remove	Removes a marker from the Measurement Markers collection.
Results.CalculateMaximum	Calculates the maximum value of a characteristic for all the found edges or stripes of a multiple marker.
Results.CalculateMean	Calculates the mean value of a characteristic for all the found edges or stripes of a multiple marker.
Results.CalculateMinimum	Calculates the minimum value of a characteristic for all the found edges or stripes of a multiple marker.
Results.CalculateStandardDeviation	Calculates the standard deviation of a characteristic for all the found edges or stripes of a multiple marker.
Results.Item.Draw	Draws specific result features in the destination image.
Results.Item.Edge1.Draw	Draws specific result features of the first edge of the found stripe, in the destination image.
Results.Item.Edge2.Draw	Draws specific result features of the second edge of the found stripe, in the destination image.
ShowPropertyPages	Opens the specified property pages of the Measurement control in a window.

  

Properties	Description
Markers	Returns the collection of markers of the Measurement control, allowing access to the collection's elements.
Markers.Item.Contrast	Allows you to specify the marker's expected contrast.
Markers.Item.EdgeStrength	Allows you to specify the marker's expected edge strength.
Markers.Item.EdgeThreshold	Returns or sets the edge value beneath which a grayscale variation is not considered an edge.
Markers.Item.FilterSmoothness	Returns or sets the degree of smoothness (strength of denoising) applied to the internal projection buffer of the search region during the edge extraction.
Markers.Item.NumberOfInsideEdges	Allows you to specify the expected number of inside edges of a stripe marker.
Markers.Item.Polarity	Allows you to specify the marker's expected polarity.
Markers.Item.Position	Allows you to specify the expected position of the marker.

## Measurement control (continued)

Properties	Description
Markers.Item.SearchRegion	Allows you to specify the region within the target image to search for the marker.
Markers.Item.SearchRegion.Angle	Allows you to specify the angle, or angular range, of the search region.
Markers.Item.Spacing	Allows you to specify the expected inter-edge or inter-stripe spacing of a multiple marker.
Markers.Item.Width	Allows you to specify the expected width of a stripe marker.MeasurementList.
Markers.Item.Spacing	Allows you to specify the expected inter-edge or inter-stripe spacing of a multiple marker.
PixelAspectRatio	Allows you to specify or determine the target image's pixel aspect ratio.
Results	Returns the collection of measurement results obtained with the Measurement control, allowing access to the collection's elements.
Results.EdgeValues	Returns the collection of edge values available to the Measurement control, allowing access to its elements.
Results.Item.Edge1	Returns the measurement results for the first edge of the occurrence of the stripe marker.
Results.Item.Edge2	Returns the measurement results for the second edge of the occurrence of the stripe marker.
Events	Description
ResultsModified	Occurs after results have been modified.

## ModelFinder control

Use geometric features (i.e., contours) to find models in an image. This control includes functions to define models, control search strategy, and save and restore a model.

Methods	Description
Find	Searches for the models of the ModelFinder control in the target image.
Load	Loads a previously saved ModelFinder control from a file.
LoadStream	Loads the settings of a previously saved ModelFinder control from a file or memory.
FindInEdgeFinderResults	Searches for the models of the ModelFinder control, in the results of an EdgeFinder control.
Models.AddCircleModel	Adds a model of a circle to the collection of models.
Models.AddCrossModel	Adds a model of a cross to the collection of models.
Models.AddAddDiamondModel	Adds a model of a diamond to the collection of Model Finder models.
Models.AddDxfModel	Defines a model from a CAD DXF file and adds it to the collection of models.
Models.AddEdgeModel	Adds a model defined from the edge extraction results obtained by a specified EdgeFinder control.
Models.AddEllipseModel	Adds a model of an ellipse to the collection of models.
Models.AddFromMerge	Adds a model from the active edges of two other models in the control, to the collection of Model Finder models.
Models.AddFromResult	Adds a model from the edges of one or all the results, to the collection of Model Finder models.
Models.AddImageModel	Adds a new image type model, from the specified image, to the collection of ModelFinder models.
Models.AddRectangleModel	Adds a model of a rectangle to the collection of models.
Models.AddRingModel	Adds a model of a ring to the collection of models.
Models.AddSquareModel	Adds a model of a square to the collection of models.
Models.AddTriangleModel	Adds a model of a triangle to the collection of Model Finder models.
Models.Item.Draw	Draws specified model features in the destination image.
Models.Item.Mask	Masks regions of the specified model.
Models.Remove	Removes a model from the collection of model finder models.
Preprocess	Preprocesses the ModelFinder control. This method extracts the active edges of models contained within the ModelFinder control and sets internal search settings so that future search will be optimized for speed and robustness.
Results.Item.Draw	Draws the specified features of the occurrence in the destination image at the found position, angle, and scale.
Save	Saves the settings of the ModelFinder control to disk.
SaveStream	Saves the settings of a ModelFinder control to a specified file or memory.
ShowPropertyPages	Opens the specified property pages of the ModelFinder control in a window.

## ModelFinder control (Continued)

Properties	Description
FilterMode	Returns or sets the filtering mode to use for the edge extraction.
ModelFinderType	Returns or sets the type of search algorithm used by the ModelFinder control.
Models	Returns the collection of models available to the ModelFinder control, allowing access to its elements.
Models.Accuracy	Returns or sets the accuracy required when searching for ModelFinder models.
Models.Count	Returns the number of elements in the collection of ModelFinder models.
Models.DetailLevel	Returns or sets the level of details to extract from the model source and target images.
Models.DetailLevel	Returns or sets the level of details to extract from the model source and target images.
Models.Item.Chains	Returns the collection of chains associated with the active edges of the model, allowing access to the collection's elements.
Models.Item.Position	Allows you to specify or determine the position range in the target where positions for model occurrences can be found.
Models.SearchPositionEnabled	Returns or sets whether to perform calculations specific to position-range search strategies.
Models.SearchScaleEnabled	Returns or sets whether a search through a range of scales is enabled.
Models.SharedEdges	Returns or sets whether sharing of edges between occurrences is enabled.
Models.SmoothnessLevel	Returns or sets the degree of smoothing applied to the model source and target images.
Models.Speed	Returns or sets the required search speed.
Models.TotalNumberOfOccurrences	Returns or sets the maximum number of all model occurrences (for all models within the ModelFinder control together) to find in the target image.
Results	Returns the collection of ModelFinder results obtained by the ModelFinder control after a call to the Find method, allowing access its elements.
Results.Item.ModelChains	Returns the collection of model chains calculated for the model, allowing access to the results of each chain.
Results.TargetChains	Returns the collection of chains in the target image, allowing access to the results of each chain.

### PatternMatching control

Used to locate patterns in an image using normalized grayscale correlation (NGC). This control includes functions to define a pattern, control search strategy, and save and restore a pattern.

Methods	Description
FindModel	Finds the specified pattern matching model(s) in the target image.
Models.AddAutomatic	Automatically adds a new unique model of the specified type to the collection.
Models.Item.Draw	Draw specific features of the model in the destination image.
Models.ImportDontCareImage	Sets the model's "don't care" pixels.
Models.Item.Preprocess	Preprocesses the pattern matching model. This trains the PatternMatching control to search for a model in the most efficient manner.
Models.Save	Saves the model to disk.
Models.Load	Loads the model from disk.
Results.Item.Draw	Draw specific features of the result occurrence in the destination image.
ShowPropertyPages	Opens the specified property pages of the Pattern Matching control in a window.

  

Properties	Description
Models	Returns the collection of pattern matching models available to the PatternMatching control, allowing access to its elements.
Models.Item.AcceptanceThreshold	Returns or sets the minimum acceptance level for a match made with the specified model when it is sought in an image.
Models.Item.CertaintyThreshold	Returns or sets the match score at which an occurrence of the model is assumed, without looking for better matches elsewhere in the image.
Models.Item.NumberOfOccurrences	Returns or sets the number of model occurrences for which to search in the target image.
Models.Item.PositionAccuracy	Returns or sets the positional accuracy required when searching for the model.
Models.Item.SearchAlgorithm	Allows you to specify or determine the model's search algorithm properties.
Models.Item.SearchAngle	Allows you to specify or determine the model's angular search properties.
Models.Item.SearchRegion	Allows you to specify or determine the region in which the search will be performed.
Models.Item.Speed	Returns or sets the required search speed for the search.
MultipleModelMode	Returns or sets whether you can search for more than one model with the FindModel method.
Results	Returns the collection of pattern matching results obtained by the PatternMatching control, allowing access to its elements.

  

Events	Description
ResultsModified	Occurs after results have been modified.

### **StringReader control\***

Feature-based character recognition. This control supports multiple user-defined grammar rules and multi-font definition in a single context.

Methods	Description
Fonts.Add	Adds a font to the StringReader control's font collection.
Fonts.Remove	Removes the Font at the specified index from StringReader's fonts collection.
Load	Loads the StringReader control information from a file and allocates it on the system specified by the OwnerSystem Property.
LoadStream	Loads the settings of a previously saved StringReader control from a file or memory.
Preprocess	Prepares the string reader control, it's fonts and string models for reading.
Read	Perform a read operation in the specified target image.
Save	Saves the StringReader Control to a file.
SaveStream	Saves the settings of a StringReader control to a specified file or memory.
Models.Load	Loads the model from disk.
Results.Item.Draw	Draw specific features of the result occurrence in the destination image.
ShowPropertyPages	Opens the specified property pages of the Pattern Matching control in a window.

  

Properties	Description
CharacterEncodingType	Returns or sets the type of character encoding used by the string reader control.
Fonts	Returns the collection of fonts available to the StringReader control, allowing access to its elements.
Image	Returns or sets the image used as the target image for the string reader control.
LastDrawSizeX, Y	Returns the last Size X or Y needed by the last call to the Draw method.
MinimumContrast	Returns or sets the minimum contrast between a character of the target image and it's background.
Results	Returns the collection of StringReader results.
Results.Characters.Item. AspectRatio	Returns the aspect ratio of the character.
Results.Characters.Item. ConsecutiveSpaces	Returns the number of consecutive spaces that can be inserted between this character and the following character in the string.
Results.Characters.Item.PositionX, Y	Returns the position X or Y of the character.
Results.Characters.Item.Scale	Returns the scale of the character.
Results.Characters.Item. TransformationCoefficients	Returns the forward or reverse transformation coefficients 'a', 'b', 'c', 'd', 'e', or 'f'.
Results.Characters.Item.Value	Returns the character read.

\* Available as of Processing Pack 1.

## StringReader control (continued)\*

Properties	Description
Results.Characters.Item.AspectRatio	Returns the aspect ratio of the character.
Results.Characters.Item.AspectRatio	Returns the aspect ratio of the character.
Results.Characters.Item.AspectRatio	Returns the aspect ratio of the character.
Results.DrawingParameters.RelativeOriginX, Y	Returns or sets the relative x or y offset attached to the origin of the destination image when drawing results.
Results.DrawingParameters.ScaleX, Y	Returns or sets the scale in the x direction attached to the destination image when drawing results.
Results.Strings.Item. FormattedValue	Returns the formatted string.
SeparatorCharacter	Returns or sets the character to be used as a string separator within the formatted text read.
ScoreNumber	Returns or sets the number of the score to evaluate on the sorted candidates.
ScoreType	Returns or sets the type of user score to use.
SpaceCharacter	Returns or sets the character to be used as a space character within the formatted text read.
Speed	Returns or sets the StringReader's search and read speed.
StreamSize	Returns the number of bytes required to stream the StringReader control.
StringModels	Returns the collection of string models available to the StringReader control, allowing access to its elements.
StringReaderType	Returns or sets the StringReader control's type.
Events	Description
ResultsModified	Occurs after results have been modified.

\* Available as of Processing Pack 1.



## Threading control

Used for the allocation of ActiveMIL thread contexts and synchronization events, including control over the created ActiveMIL thread contexts and events, inquire about various settings, and synchronize execution of multiple threads.

Methods	Description
Events.AddFromExternalEvent	Adds a new ActiveMIL event to the collection of threading events by mapping it to an existing ActiveMIL event.
Events.Item.SetState	Sets the state of the ActiveMIL threading event.
Wait	Performs a wait operation on an ActiveMIL selectable thread or ActiveMIL threading event.
ShowPropertyPages	Opens the specified property pages of the Threading control in a window.
Threads.Item.CommandsAbort	Aborts all the ActiveMIL commands queued in the selectable thread.

  

Properties	Description
Events.Item.AutoReset	Returns whether the threading event is reset automatically.
Threads.Item.Priority	Returns or sets the priority status of the ActiveMIL selectable thread.
Threads.Item.SynchronizationMode	Returns or sets the synchronization mode of the ActiveMIL selectable thread.
Threads	Returns the collection of ActiveMIL selectable threads available to the Threading control, allowing access to its elements.