



Tools























Image Processing	Graphics & Calculations	Pointlist	String-buffer	GUI
Statistic counters	Input & Output	Program flow	Other	






The number of **VIMOS** tools is ever increasing. Since the software is running on different hardware platforms, not all tools are available everywhere. The following table is intended to give a quick overview. Some of the tools have more than one function. If you seek for something, it might not be found in the name of the tool, but in the short description given here.



















While you can call your own software modules from **VIMOS**, it would still be good, if you would call when you miss a tool with a given functionality. Probably it is on our list of tools to be added, so maybe we can prepare it for your application.













Most tools are available for **ALL** cameras. Some of the most powerful tools need to many resources. So they are available only on the **TI-CAMs**, which are the VC-cameras having VC20xx designators. Then there are tools, that only draw on the screen. Such tools are without use on sensors without a video-output and are therefore labeled as available only on **CAMs** (cameras). Finally there are tools that work with special hardware features of the **Sensors** or even more specific, the **M40**.














For more information please [download](#) the 'Tools description' document.









Image processing	Cameras	Description
 Median filter	ALL	good to filter noise out of images
 3x3 Convolution filter	ALL	many uses, i.e. sharpening, softening, edge enhancement
 Barcode reader	ALL	reads Code 39 and Interleaved 2 of 5, ask for others pls.
 Rectangle test	ALL	relation bright / dark within an area (threshold, rotatable)
 Circle test	ALL	relation bright / dark within a circular area
 Color pixel counter	ALL	multiuse color-segmentation or grayscale texture analysis
 Contour	ALL	subpixel-precise contour-following
 Correlation init	ALL	store a pattern for later selection by the Correlation exec
 Correlation exec	ALL	normalized correlation - searching by matching patterns
 Edge detection	ALL	high-quality filtered single-line edge-detector
 Fast edge detection	ALL	fast version of the edge-detector, only 0, 45, 90 ... degrees
 Edge detection 2	ALL	multi-line, fast, threshold based edge-detector
 Find blobs	ALL	image binarization (2 thresholds) and object segmentation
 Image area	ALL	Copy,And,Or,Xor,Not,Add,Sub,Min,Max,Pyramid,Subsample
 Image projection	ALL	horizontal or vertical projection : average brightness
 Light balance	ALL	checks the average brightness - detects illumination failure
 Percent threshold	ALL	threshold that follows brightness, also average brightness
 OCR tool	ALL	simple OCR, teachable, size independent, rotatable
 Object recognition ini	TI-CAMs	teach an object to recognize later
 Object recognition exec	TI-CAMs	recognize objects, even zoomed, rotated and occluded
 Load image area	ALL	loads part of an image from flash, like patterns or masks
 Save image area	ALL	saves part of an image, like error-images or patterns







Graphics & Calculations	Cameras	Description
 Marker	ALL	draws a cross of the size you wish at a point you specify
 Text box	CAMs	text output
 Distance	ALL	distance measurement between points and / or lines
 Angle	ALL	angle measurement
 Calculator	ALL	calculations with tool-results

	Tolerance	ALL	checks if a value is within a given range
	Midpoint	ALL	creates a point on the line between 2 pts. between or behind
	Make point	ALL	creates a point at a location specified by two values
	Convert point	ALL	creates values out of the X and Y coordinates of a point
	Infinite line	ALL	draws a line given by a point and an angle
	2-point infinite line	ALL	draws a line through two points and returns the angle
	Finite line	CAMs	draws a line between two points
	Best line	ALL	approximates a best-fit line from up to 10 points, <u>see also</u>
	Line-cross	ALL	returns the crossing point of two lines
	Point-projection	ALL	returns the point on a line, that is closest to a given point
	Line across circle	ALL	returns the points where a line crosses a circle
	Tangent	ALL	returns closest, farthest and the two tangential points
	2-point circle	ALL	draws a circle from center and point, gives the radius
	3-point circle	ALL	draws a circle from 3 points, gives center, radius and area
	Best circle	ALL	approximates a best-fit circle from up to 10 points, <u>see also</u>
	Circle-cross	ALL	finds the crossing points of two circles
	Rectangle	ALL	draws a rectangle from center, angle and size, gives area
	Coordinate system	CAMs	draws a coordinate system






Pointlist	Cameras	Description
	ALL	loads a pointlist from flash, good for program-parameters
	ALL	saves a pointlist to flash-memory
	ALL	sets one of the 8 parameters of a part of the pointlist
	ALL	sets one element of the pointlist (point + 8 parameters)
	ALL	gets one of the 8 parameters from one element of the list
	ALL	gets one element of the pointlist (point + 8 parameters)
	ALL	gets the information of one blob object from the pointlist
	ALL	rearranges pointlist elements depending on one parameter
	ALL	copies part of the pointlist depending on one parameter
	ALL	more than one way to display points from the pointlist
	ALL	generates coordinates on a line in pointlist elements
	ALL	generates coordinates on a circle in pointlist elements














	Move & Rotate pointlist	ALL	displaces and rotates pointlist coordinates vs. point or line
	Get grayvalues from pts.	ALL	reads the grayvalue at point locations into a parameter
	Pointlist median filter	ALL	filters a parameter sequence over a part of the pointlist
	Pointlist edge-detection	ALL	detects edges on a parameter sequence
	Pointlist distance	ALL	fills a parameter sequence with the distance to a point or line
	Pointlist angle	ALL	fills a parameter sequence with the angle to a point
	Pointlist Best-line	ALL	approximates a best-fit line from pointlist points
	Pointlist Best-circle	ALL	approximates a best-fit circle from pointlist points
	Pointlist Hough-line/circle	TI-CAMs	approximates a Hough line or circle from pointlist points
	Contour matching	TI-CAMs	very powerfull multi-contour object comparison, subpix errors
	Matching error filter	ALL	filter for creating two-dimensional error-objects
	Pointlist compare	ALL	finds best matched position between lists, linear and circular
	Fast pointlist compare	ALL	same as above, but integer precision instead of floating pt.






String-buffer	Cameras	Description
	ALL	loads strings from flash - i.e. for the graphical user-interface
	ALL	saves strings to flash - i.e. from OCR, barcode, ...
	ALL	sets an element of the String-buffer
	ALL	gets an element of the String-buffer
	ALL	takes a value (result) and writes it as a sequence of numbers
	ALL	takes a sequence of numbers and returns a value (result)
	CAMs	displays a string on the screen
	ALL	compares two strings



Graphical user-interface	Cameras	Description
	TI-CAMs	draws a window
	TI-CAMs	draws a button
	TI-CAMs	draws an edit or text field
	TI-CAMs	draws a group of radio-buttons
	TI-CAMs	draws a checkbox
	TI-CAMs	draws a spin-control or toggle-text (instead of combo-box)










 Initialize GUI **TI-CAMs** initializes various properties of the GUI

Statistic counters	Cameras	Description
 Reset counters to 0	ALL	resets one or all counters to zero
 Increment counter	ALL	increments a counter (+1)
 Decrement counter	ALL	decrements a counter (-1)
 Set counter	ALL	sets a counter to a given value
 Save counters to flash	ALL	saves all counters to flash, they are reloaded at power-up

Input / Output	Cameras	Description
 Get I/Os	ALL	reads the state of the PLC-input-lines
 Set I/Os	ALL	sets the state of the PLC-output-lines
 Get I/O-box	ALL	reads the state of the PLC-input-lines from an extension-box
 Set I/O-box	ALL	sets the state of the PLC-output-lines of an extension-box
 Clean serial input queue	ALL	deletes the content of the serial input-buffer
 Receive result	ALL	receives a result value via serial port
 Send result	ALL	sends a result value via serial port
 Receive string	ALL	receives part of the string-buffer via serial port
 Send string	ALL	sends part of the string-buffer via serial port
 Receive pointlist	ALL	receives part of the pointlist via serial port
 Send pointlist	ALL	sends part of the pointlist via serial port
 Receive image-area	ALL	receives a rectangular area of the image via serial port
 Send image-area	ALL	sends a rectangular area of the image via serial port

Program flow	Cameras	Description
 Cycle counter	ALL	number of program executions - good for initializations
 IF / ELSE / CASE	ALL	enables conditional execution
 GOTO	ALL	jumps to a label
 LABEL	ALL	labels a place to jump to
 Load user-program	ALL	loads another user-program

 Exec (external source)	ALL	executes an external exec-module (alien source)
 Exit	ALL	exits the program to Edit-mode or operation system

Other	Cameras	Description
 Take picture	ALL	takes a new picture with given shutter and triggering
 Take CMOS picture	M40	takes a new picture of given size, shutter and triggering
 Copy picture	ALL	copies the entire image between frame & freeze buffers
 Button & LED	Sensors	checks the button and sets the LEDs off the sensors M40,50
 Pause / Wait	ALL	stops the execution for a given time or until a mouse-click
 Timer	ALL	returns elapsed time in hr:min:sec:ms - up to 10 timers
 Delete file / Pack flash	ALL	deletes a file and does fast flash-packing
 Free correlation pattern	ALL	deletes one of the patterns loaded with Correlation init
 Select calibration set	ALL	activates one of the calibration sets

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