This section describes the command set of DV. The definition use the following conventions:

`Normal Courier` fonts must be type as showed.

`Italic Courier` fonts represents choice or value to be determined by the user. These are further explained under the Range. Some examples:

`{off|on}` – represent a list of choice. You must select one.

`[value]` – the *`[]`* represent a optional parameter.

Active – Sets the active canvas.

Prompt	'ActiveDisplay' in the Display Options.
Range	DpyInx - Display Index (0, 1, 2, …, etc)
Syntax	`Active` *`DpyInx`*

BoxCentroid – Finds and identifies the centroid of pixel in the ObjBox for display dpinx. .

Prompt	'BoxCentroid' button on the Display Option (image) Page.
Syntax	`BoxCentroid [`*`Dpinx`*`]`
Range	Dpyinx – Display Index (0, 1, 2, etc). Default to active canvas if not specified.

BoxCopy – Copies a subarray from one buffer into the dest buffer. The subarray is identified from the object box's x, y, wid, and hgt.

Prompt	N/A.
Range	SrcBufID – Source Buffer ID (a, b, c, e,…)
	DestBufID – Destination Buffer ID (a, b, c, e,…)
Syntax	`BoxCopy` *`SrcBufID to DestBufId`*

BoxPeak – Finds and identifies the peak pixel in the ObjBox for display dpinx. .

Prompt	'BoxPeak' button on the Display Option (image) Page.
Syntax	`BoxPeak [`*`Dpinx`*`]`
Range	Dpyinx – Display Index (0, 1, 2, etc). Default to active canvas if not specified.

BoxZoom – Set the Image Zoom on the active display so that the object box fills as much as the display as possible.

Prompt	'BoxZoom' button on the Display Option (image) Page.
Syntax	`BoxZoom`

Buffer – Changes the data buffer associated with the specified display window.

Prompt	'Buffer' on the Display Options Page.
Range	BufID – buffer ID (a, b, c, e,…).
	DpInx – Display Index (0, 1, 2,…)
Syntax	`Buffer` *`BufID DpInx`*

BufInfo – Display some information about a buffer to stdout. This is an example of verbose output. Non-verbose just displays the last line.

```
    Status 2
    naxis1 256
    naxis2 256
      size 4
    bitpix -32
         N 65536
       max 3944.000000
       mix -2868.000000
      mean 21.213593
    stddev 45.805237
      as/p 0.300000
   divisor 1.000000
 directory /home/denault/data
  filename data0001.a
     Min     Max    Mean     STD    data[64,64]    x  y  wid hgt  objMin
objMax objMean objSTD
 -2868.0 3944.0   21.2   45.81        25.00    168  71   15  14   12.0
540.0   39.6   57.41
```

Prompt	None.
Range	BufID – buffer ID (a, b, c, e,…)
	Verbose_flag – 0 or concise, 1 for verbose.
Syntax	`Buffer` *`BufI verbose_flag`*

Clear – Delete the data inside a buffer.

Prompt	'Clear' button on the Math Page.
Range	BufID – buffer ID (a, b, c, e,…)
Syntax	`Buffer` *`BufID`*

cm.Center – The ColorMap Center command determines the midpoint of the colormap.

Prompt	None. Type the command in the command prompt.
Range	Value – ranges from 0 to 1, 0.5 being the middle.
Syntax	`Cm.Center` *`value`*

cm.Width – The ColorMap Width command adjusts the width of the colormap.

Prompt	None. Type the command in the command prompt.

Range Value – ranges from 0 to 1, 0.5 being the normalize value.

Syntax `Cm.Width value`

ColorMap – Reads a colormap definition file, which defines the colormap RGB values.

Prompt option menu to the right of the Colormap display, on the menu bar.

Range The standard colormap files are: a.cm, b.cm, bb.cm, c.cm, gray.cm, i8.cm.

Syntax `ColorMap filename`

ColorMap.Inverse – Inverses the current installed color map.

Prompt 'colormap.inverse' button on Setup Tab.

Syntax `Colormap.inverse`

Copy – Copies data from one buffer to another.

Prompt 'Copy' button on the Math Page.

Range SrcBufID – Source Buffer ID (a, b, c, e,…)

DestBufID – Destination Buffer ID (a, b, c, e,…)

Syntax `Copy SrcBufID to DestBufId`

DisplayType – Determines how the data is displayed in the Display Windows.

Prompt 'DisplayType' menu on the Display Options Page.

Range DisplayTypes are:

Image – image of pixel data.

Header – FITS header display.

Histogram – Histogram of data distribution.

LineCut – Line Graph of selected row and column.

XlineCut – Line graph between any 2 pixels.

Noise – Channel noise calculations.

Pointer – Follow the point in an image mode.

DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.

Syntax `DisplayType {Image|...|Pointer} [DpInx]`

DivByCoadds – Enables/disables the divide by coadds option. Enabling the option cause the representation of the data to be divided by a normalization factor from the FIT header.

Prompt 'DivByCoadds' toggles on the Setup Page.

Range OFF – Display actual pixel values.

ON – Pixels values are divided by normalization factor.

Syntax `DivByCoadds {off | on}`

Echo – Display a string in the feedback text window.

Range string – Text message to be displayed.

Syntax `Echo string`

Filter1 – Changes the data in the buffers by:

1. Rescales the data so [mean-std, mean+std] maps to 25 to +25.
2. Convert any negative values to 0.

This filter algorithm could be applied on a image before using the BoxCentroid command to improve the centroid calculation.

Prompt None.

Range SrcBufID – Source Buffer ID (a, b, c, e,…)

DestBufID – Destination Buffer ID (a, b, c, e,…)

Syntax `Filter1 SrcBufID to DestBufId`

Filter2 – Changes the data in the buffers by:

1. Remaps the data so the mean is equal to 0.
2. Divides the data by the standard deviation.
3. Converts any value <= 1 to zero.

This filter algorithm could be applied on a image before using the BoxCentroid command to improve the centroid calculation.

Prompt None.

Range SrcBufID – Source Buffer ID (a, b, c, e,…)

DestBufID – Destination Buffer ID (a, b, c, e,…)

Syntax `Filter1 SrcBufID to DestBufId`

FullImage – This command adjusts the zoom parameter display so the entire image is visible in the active display.

Prompt 'FullImage' button on the Display Options (image) Page.

Syntax `FullImage`

HistArea – Defines the range of pixels to be included in the histogram display.

Prompt 'Area' toggles on the Display Options (histogram) Page.

Range All - all pixel values are used.

Box – only pixels in the ObjBox are used.

DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.

Syntax `HistArea { All | Box } [dpinx]`

HistBin – Sets the number of bins for a histogram display

Prompt 'Num of Bins' on the Display Options (histogram) Page.

Range Num – Number of bins (1 to 100).

DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.

Syntax `HistBin Num [dpinx]`

ImageAutoScale – When ON, the ImageRange is automatically set by the auto scaling algorithm. This adjustment occurs whenever data in the buffer changes..

Prompt 'AutoScale' toggles on the Display Options (image) Page.

Range Fixed – Scale colors to value in ImageRange.

Auto – Automatically scales range according to data statistics.

DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.

Syntax `ImageAutoScale { Fixed | Auto } [dpinx]`

ImageRange – The image range specifies the minimum and maximum values that are mapped to the colormap when the images are rendered.

Prompt 'Range' on the Display Options (image) Page.

Range From -2^31 to 2^31.

DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.

Syntax `ImageRange min max [dpinx]`

ImageScale1P – This command sets autoscale to fixed, and sets the image range to include all the pixel values except for the top and bottom 1 percent of the data.

Prompt '1-99% Fixed Scale' button on the Display Options (image) Page.

Range DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.

Syntax `ImageScale1P [dpinx]`

ImageShowScale – Indicates whether to display an arcsecond scale along side the image display

Prompt 'ShowScale' toggles on the Display Options (image) Page.

Range OFF hides, ON shows the scale.

DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.

Syntax `ImageShowScale {off | on} [dpinx]`

ImageZoom – Sets the zoom level for an image display.

Prompt 'Zoom' slider on the Display Options (image) Page.

Range Zoom can be -5 to 20, except zoom can't be 0.

DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.

Syntax `ImageZoom zoom [dpinx]`

LCutArea – Defines the range of pixels to be included in the Line Cut graph.

Prompt 'Area' toggle on the Display Options (linecut) Page.

Range All - all pixel values are used.

Box – only pixels in the ObjBox are used.

DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.

Syntax `LCutArea { All | Box } [dpinx]`

LCutAutoScale – Turns the automatic auto-scaling feature OFF or ON for the line cut graphs.

Prompt 'Auto Scale' toggles on the Display Options (linecut) Page.

Range OFF – scale graph to range min & max.

ON – autoscale using max and min data values.

DpInx – Display Index (0, 1, 2,…). Optional, defaults to Active Display.

Syntax `LCutAutoScale { off | on } [dpinx]`

LCutRange – Sets the min and max for the Line Cut graph when the autoscale feature is OFF.

Prompt 'Range' on the Display Options (linecut) Page.

Range From -2^31 to 2^31.

DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.

Syntax `LCutRange min max [dpinx]`

LCutXY – Specifies which column (X) and row (Y) are used when drawing the XY line cuts.

Prompt 'X Axis' and 'Y Axis' on the Display Options (linecut) Page.

Range X and Y must be from 0 to max of row or column.

DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.

Syntax `LcutXY X Y [dpinx]`

Math – Simple math operations on image buffers can be performed in DV by entering a math expression as a command. DV can only understand very simple syntax for math using 2 buffer operands, or a buffer & a constant operand. For example, `C = A - B`, or `C = C * 10.5`.

Prompt ‘Execute’ button & entry on Math Page.

Range dest, opbuf – Buffer ID (a, b, c, …).

Operation – must be symbol for multiplication, division, addition, or subtraction.

Num – floating point constant.

Syntax `destbuf = opbuf {*|/|+|-} opbuf|num`

m.edit – The macro edit command opens a macro text file using nedit text editor.

Prompt The ‘edit’ button on the Macro dialog box opens selected file.

Range filename – any legal filename.

Syntax `m.edit filename`

m.execute – The macro execute command begins the execution of a macro file.

Prompt The ‘execute’ button on the Macro dialog box executes the selected file.

Range filename – any legal filename.

Syntax `m.execute filename`

m.filemask – Applies the mask to the macro file list display on the macro dialog box.

Prompt The ‘mask’ entry on the Macro dialog box.

Range mask – This string is used as the mask.

Syntax `m.filemask mask`

m.load – Loads a file inside the macro dialog box’s text window.

Prompt Selecting any entry in the macro file list automatically loads the file.

Range filename – any legal filename.

Syntax `m.load filename`

m.path – Set the subdirectory for the file list in the macro dialog box. This must be an existing subdirectory.

Prompt ‘Path’ in the Macro dialog box.

Range directory – An existing directory.

Syntax `m.path directory`

m.refresh – Refreshes the file list in the Macro dialog box.

Prompt ‘Refresh’ button on the Macro dialog box.

Syntax `m.refresh`

m.setbutton – Loads short cut button for the selected macro file.

Prompt ‘m.setbutton’ button and option menu.

Range index – which function button to set, 0 to 5.

Directory & filename – Identifies the macro file to be executed when the user selects the function button.

Syntax `m.setbutton index directory filename`

m.stop – Stop the currently executing macro file.

Prompt ‘Stop’ button on the Macro dialog box.

Syntax `m.stop`

NoiseArea – Defines the range of pixels to be included in the noise display.

Prompt ‘Area’ toggles on the Display Options (noise) Page.

Range All - all pixel values are used.

Box – only pixels in the ObjBox are used.

DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.

Syntax `NoiseArea { All | Box } [dpinx]`

NoiseAutoScale – When ON, the NoiseG1Range and NoiseG2Range are automatically set by the auto scaling algorithm. This adjustment occurs whenever data in the buffer changes.

Prompt ‘AutoScale’ toggles on the Display Options (noise) Page.

Range Fixed – Scale range to value in NoiseG1Range and NoiseG2Range.

Auto – Automatically scale range according to data statistics.

DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.

Syntax `NoiseAutoScale { Fixed | Auto } [dpinx]`

NoiseG1Range – Sets the min and max for the noise graph 1 when the autoscale feature is OFF.

Prompt	'Graph 1 Range' on the Display Options (noise) Page.
Range	From -2^31 to 2^31.
	DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.
Syntax	`NoiseG1Range` *`min max [dpinx]`*

NoiseG2Range – Sets the min and max for the noise graph 2 when the autoscale feature is OFF.

Prompt	'Graph 2 Range' on the Display Options (noise) Page.
Range	From - 2^31 to 2^31.
	DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.
Syntax	`NoiseG2Range` *`min max [dpinx]`*

NoiseGraphType – Sets the graph type for the noise display.

Prompt	'Graph Type' toggles on the Display Options (noise) Page.
Range	Text – the data are displayed in tabular form
	Graph – the data are displayed as graphs.
	DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.
Syntax	`NoiseGraphType` *`{ Text | Graph } [dpinx]`*

NoiseMod – Sets the modual value for the noise display. This value control how the columns are grouped together.

Prompt	'Mod' on the Display Options (noise) Page.
Range	Num – ranges from 1 to 256, 4 being the default value.
	DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.
Syntax	`NoiseMod` *`num [dpinx]`*

Path – The path identifies the subdirectory where you will read and write data files. This command sets both the paths in the save and open dialog boxes at the same time.

Prompt	None. Type the command in the command prompt.
Range	any legal Unix subdirectory.
Syntax	`Path` *`string`*

Print – This command produces a postscript file of the graph or image in a canvas window and sends this file to the printer specified by the printer variable. This postscript file is named 'dv_print.ps'.

Prompt	Each printable graph has a 'Print' button on the main panel.
Range	DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.
Syntax	`Print` *`[dpinx]`*

Printer – Identifies the printer used by the print command.

Prompt	'Printer' on the Setup Page.
Range	Enter the name of a postscript printer on the network., irlabpr being the default printer.
Syntax	`Printer` *`printername`*

PrinterType – For hardcopy of image, this command specifies either a color or black & white postscript output.

Prompt	'PrinterType' on the Setup Page.
Range	BW_Postscript (default)
	Color_Postscript
Syntax	`PrinterType` *`{ BW_Postscript | Color_Postscript }`*

PrinterToFile – This command specifies whether the postscript output is actually printed on the printer or just saved to a file, when 'ON' is selected.

Prompt	'PrinterToFile' toggles on the Setup Page.
Range	OFF – postscript file is sent to the printer.
	ON – postscript file is saved but not printed.
Syntax	`PrintToFile` *`{ off | on }`*

PtImageSize – The Pointer Image Size command sets the width & height (in number of pixels) of the image display in the pointer display.

Prompt	'ImageSize' on Display Options (pointer) Page.
Range	npixels – wid&hgt in number of pixels. Ranges limited to 11 to 31 (only odd values are used).
	dpinx – Display Index (0, 1, 2,..) Defaults to Active Display.
Syntax	`PtImageSize` *`npixels [dpinx]`*

Push – Pushes a command on DV's internal command stack. This command stack is executed after every socket connection. This command should be used only by application connecting to DV's command socket.

Syntax `Push command`

Quit – Exits the dv program.

Prompt 'Quit' button on the menu bar.

Syntax `Quit`

Read – Read a data file from the indicated path/filename into the buffer.

Prompt The 'OK' button on the Open File dialog box.

Range path/filename – Identifies the FITS file to be read.

buffer - Any valid buffer, for example 'B'.

Syntax `Read filename { A | ... | F }`

ReadFile – Reads a file from the default directory. Note only the filename is specified in the command.

Prompt None. Type the command in the command prompt.

Range filename – Identifies the FITS files to be read. This file should be located in the direction specified by PATH.

buffer - Any valid buffer, for example 'B'.

Syntax `ReadFile filename { A | ... | F }`

ReadMovie – Reads the 1st frame from a 3D FITS files into DV.

Prompt 'ReadMovie' button on the open file dialog window.

Range path/filename – Identifies the FITS file to be read.

Bufid – destination buffer, for example 'B'

Syntax `ReadMovie path/filename bufid`

ReadSock – It is intended for other applications that wish to send FIT data to DV through the socket.

Prompt None. This command should be issued only via a DV socket..

Range bufid – destination buffer for the data, for example 'B'

Syntax `ReadFile bufid`

Rotate – Rotates the data in a buffer by translating the X and Y axis. The buffer can be 90º clockwise, 90º counterclockwise, or 180º.

Prompt 'Rotate' on the Math Page.

Range M90 – Minus 90º (counterclockwise)

P90 – Plus 90º (clockwise)

180 – rotate buffer 180º

Buffer – buffer to be rotated

Syntax `Rotate { M90 | P90 | 180 } buffer`

Save – Writes the content of a buffer to a fits file in the current Path. Specifying a filename is optional. If a filename is not specified, the program will use the name assigned to the data.

Prompt 'OK' on the Save File dialog box.

Range buffer - the data buffer.

Syntax `Save buffer filename`

SaveFile – Mimics saving a file without actually reading the file.

Prompt 'OK' on the Save File dialog box.

Range buffer - the data buffer.

Syntax `SaveFile buffer filename`

ShowMovie – This command reads and display all frames from a 3D FITS file. Allows you to quickly view the movie data.

Prompt 'ShowMovie' button on the open file dialog window.

Range path/filename – Identifies the FITS file to be read.

Bufid – destination buffer, for example 'B'

Syntax `ReadMovie path/filename bufid`

Smooth – Applies a smoothing algorithms to the data. Each pixel value is replaced by the mean of the pixel and its 8 neighboring pixels.

Prompt None.

Range srcBuf – data to smooth.

destBuf – destination buffer.

Syntax `Smooth srcBuf to destBuf`

SpexCom – Issues a command to spex's IC application. The IC and DV application must be executing on the same hosts..

Prompt None.

Range string – This string is sent to the spex IC.

Syntax `SpexCom string`

Sqrt – Takes the square root of the buffer.

Prompt None. Type the command in the command prompt.

Range srcBuf - buffer to be square rooted.

destBuf - buffer to store square rooted data.

Syntax `Sqrt srcBuf to destBuf`

StatsFixedWH – Controls the ability to set/fix the width and height of the stats box.

Prompt ‘StatsFixedWH’ check button on the Stats Page.

Range BufID – Buffer ID (a, b, c,…).

ON and OFF set or unset the width and height.

Wid and Hgt must be from 0 to 255

Syntax `StatsFixedWH` *`bufID { off | on } [wid hgt]`*

StatsObjBox – Sets the size and position of the rectangle area that identifies the pixels called the ObjectBox.

Prompt None. Type the command in the command prompt.

Range 0 to 255 for x, y, wid, and hgt.

bufinx - the data buffer, (a, b, c, d, e, f)

Syntax `StatsObjBox` *`x, y, wid, hgt, bufinx`*

StatsSetSky – This command sets the SkyBox position and size to be equal to the ObjectBox.

Prompt ‘Set Sky’ button on the Stats Page.

Range bufinx - the data buffer, (a, b, c, d, e, f)

Syntax `StatsSetSky` *`bufinx`*

StatsXORLine -- Set the XOR line position on the image canvas.

Prompt None. Type the command in the command prompt.

Range All coordinates must be from 0 to 255.

Syntax `StatsXORLine` *`xbeg, ybeg, xend, yend, bufinx`*

TCSCoord – Sets the angle and plate scale for the TCS coordinates.

Prompt 'Angle' and ‘Plate Scale’ on the TCS Offset Page.

Range Angle – 0.0 to 360.0.

PlateScale – 0.0 to 360.0.

Syntax `TCSCoord` *`angle platescale`*

TCSHostname – Identifies the host used to handle communications to the TCS.

Prompt 'TCSHostname' on the Setup Page.

Range Enter a valid hostname

Syntax `TCSHostname` *`host`*

UseHex – The pixel values are display on the upper right corner of the canvas on Image display mode. These values can be based in decimal or Hexadecimal.

Prompt None. Type the command in the command prompt.

Range Off - Show values as decimal

ON - Show values as Hexadecimal.

Syntax `UseHex` *`{ off | on }`*

XCutAutoScale – Sets the autoscale flag of the XLineCut graph.

Prompt 'AutoScale' on the Display Options (xlinecut) Page.

Range OFF - Use Range for scale

ON - Autoscale the range based on data.

Syntax `XCutAutoScale` *`{ off | on }`*

XCutRange – Displays the range of the XLineCut graph.

Prompt 'Range' on the Display Options (xlinecut) Page.

Range x & y must be from 0 to 255

Syntax `XCutRange` *`x1, y1, x2, y2`*

XCutSet – This command identifies the endpoints of the line of pixels used to construct the XLineCut graph.

Prompt None. Type the command in the command prompt.

Range All coordinates must be from 0 to 255.

DpInx – Display Index (0, 1, 2,…). Defaults to Active Display.

Syntax `XCutSet` *`xbeg ybeg xend yend [dpinx]`*