

# Serial Protocol of VZ-17, VZ-27, VZ-37, VZ-47 and VZ-57

No: T-99/03

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## Introduction

The VZ-17, VZ-27, VZ-37, VZ-47 and VZ-57 can be controlled via the RS-232-port by a computer or a control-system. It is possible to perform all functions of the IR-remote-control and the key-panel on the unit such as Zoom, Focus, Presets, etc. as well as a lot of other functions like reading and setting zoom-position, etc.

The protocol is upward compatible to the one of the VZ-15b/35b/45b.

## Connection

The serial-port of the Visualizers is a standard 9-pin-Sub-D-connector, which can be found on most computers too. Only pin 2 (RxD), 3 (TxD) and 5 (GND) must be connected. The baud rate is (by default) 19200. There is no parity, 8 data-bits and 1 stop-bit.

## Changing the Baud rate

It is possible to change the baud rate from 19200 to 9600, 38400 or 115200. To change the baud rate, switch the unit on and press MENU-key for four seconds, until the Extra-Menu appears. Then enter the Serial Port-sub-menu. There you can change the baud rate.

## Control-Commands

The controlling of the Visualizer is done by sending codes (each code is 1 byte) to the Visualizer: these codes perform the desired action. There is no need for Carriage Return, Linefeed or similar. By default the Visualizer doesn't respond to the commands on the serial-port (except commands which return status-information like zoom-position or Get Light on/off, etc.). With special commands this behavior can be changed so that the Visualizer sends a reply after each command (for details see "Reply Mode Control"). Some commands have a quiet long execution time therefore you shouldn't send different codes immediately one after another. If you want to check if the Visualizer is ready to receive new commands, you can send code 32 (' ') until the unit answers with 32 (' ') (Blank Echo). While the unit is not ready, there is no answer.

If you want to test the commands with a terminal-program, you may prefer to enter the commands as ASCII-text. To do so, press underscore ('\_'), the Visualizer will respond with a question mark. Then enter the 3 digit decimal number within three seconds. The command will then be performed (e.g. type '\_' '2' '0' '0' for Power On or '\_' '0' '4' '9' to select command page 1).

In the following tables you will find the decimal and the hexadecimal codes. The dollar-sign ('\$') in front of the numbers indicates that the respective number is a hexadecimal number. The dollar-sign must not be sent.

## Page-Commands

The commands are split into two pages (because for one command-page there are too many commands exist on VZ-27 and VZ-57). Basically each command is a two Byte command, page-command + control-command.

If the command-reply mode is switched on, then the Visualizer sends a reply for each Byte, a reply for the control-command and also for the page-command (for details see "Reply Mode Control").

The standard command page is "0", that means, if you want to execute a command from the page "0" (standard page), then it's not necessary to select the page "0" before. If you want to execute a command from the page "1" then you must select the page "1" and input now your command.

If the page "1" command is executed, then the Visualizer switches automatically back to the page "0".

Check "Page" column for command page in the following tables.

### Select Page Control

| Page | Dec. Code | Hex. Code | Command   | Description   | see Notes |
|------|-----------|-----------|-----------|---|-----------|
| 0    | 048       | \$30      | SER_Page0 | By sending this command the Visualizer switches to the page "0" and waits for the control command.<br>Page "0" is the standard page and it is not necessary to select it  | 1         |
| 0    | 049       | \$31      | SER_Page1 | By sending this command the Visualizer switches to the page "1" and waits for the control command.<br>After the control command is executed (i.e. 136 for Show All) the Visualizer changes back to the standard page (page 0) | 1         |

## Zoom Control

| Page | Dec. Code | Hex. Code | Command              | Description   | see Notes |
|------|-----------|-----------|----------------------|---|-----------|
| 0    | 195       | \$C3      | Zoom wide            | By sending this command the Visualizer zooms towards wide-position. For continuous zooming send this code repetitively (min. 10Hz) as long as you want to zoom.   | 2         |
| 0    | 199       | \$C7      | Zoom tele            | By sending this command the Visualizer zooms towards tele-position. For continuous zooming send this code repetitively (min. 10Hz) as long as you want to zoom.   | 2         |
| 0    | 129       | \$81      | Start Zoom wide      | This command starts to zoom towards the wide-position. The Visualizer zooms until the „Stop Zoom/Focus/Iris“-command or a different Start-Command is received (or mechanical end-position is reached).  | 2         |
| 0    | 130       | \$82      | Start Zoom tele      | This command starts to zoom towards the tele-position. The Visualizer zooms until the „Stop Zoom/Focus/Iris“-command or a different Start-Command is received (or mechanical end-position is reached).  | 2         |
| 0    | 128       | \$80      | Stop Zoom/Focus/Iris | This command stops zooming, focusing, iris and mirror-movement (if activated with the respective „Start xxx“-command before).   |           |
| 0    | 161       | \$A1      | Get Zoom-Position    | After sending this command the Visualizer sends back the current zoom-position as a 3-digit hexadecimal number in the range from '000' (wide) to 'FFF' (tele) as an ASCII-string followed by LF + CR.   | 3, 4      |
| 0    | 162       | \$A2      | Set Zoom-Position    | After this command the Visualizer echoes a question-mark ('?') with no LF + CR. After this question mark the controller should send the desired zoom-position as 3-digit hexadecimal number in the range from '000' (wide) to 'FFF' (tele) within max. 3 seconds. No CR or LF is needed. After receiving the 3rd digit the Visualizer zooms to this position.         | 3, 4      |
| 1    | 163       | \$A3      | Set Digital Zoom     | After this command the Visualizer echoes a question-mark ('?') with no LF + CR. After this question mark the controller should send the desired digital zoom-position as 3-digit hexadecimal number in the range from '000' (wide) to 'FFF' (tele) within max. 3 seconds. No CR or LF is needed. After receiving the 3rd digit the Visualizer zooms to this position. | 1, 4      |
| 1    | 164       | \$A4      | Get Digital Zoom     | After sending this command the Visualizer sends back the current digital zoom-position as a 3-digit hexadecimal number in the range from '000' (wide) to 'FFF' (tele) as an ASCII-string followed by LF + CR.   | 1, 4      |
| 0    | 142       | \$8E      | Macro Off            | Switches the Macro Off.   |           |
| 0    | 143       | \$8F      | Macro 11             | Switches the Macro 11x On.  |           |

| Page | Dec. Code | Hex. Code | Command            | Description  | see Notes |
|------|-----------|-----------|--------------------|--|-----------|
| 0    | 144       | \$90      | Macro 12           | Switches the Macro 12x On.   |           |
| 0    | 189       | \$BD      | Macro              | Switches the Macro On/Off (in the on-screen menu selected Macro position)                                    |           |
| 0    | 183       | \$B7      | Get Macro-Position | This function returns '0'+LF+CR if Macro is off, '1'+LF+CR if Macro is on 11x, '2'+LF+CR if Macro is on 12x. |           |

## Focus Control

| Page | Dec. Code | Hex. Code | Command               | Description   | see Notes |
|------|-----------|-----------|-----------------------|---|-----------|
| 0    | 194       | \$C2      | Focus far             | By sending this command the Visualizer focuses towards far. For continuous changing the focus, send this code repetitively (min. 10Hz) as long as you want to change the focus.   |           |
| 0    | 198       | \$C6      | Focus near            | By sending this command the Visualizer focuses towards near. For continuous changing the focus, send this code repetitively (min. 10Hz) as long as you want to change the focus.  |           |
| 0    | 131       | \$83      | Start Focus far       | This command starts to focus towards far. The Visualizer changes the focus until the „Stop Zoom/Focus/Iris“-command or a different Start-Command is received (or mechanical end-position is reached).   |           |
| 0    | 132       | \$84      | Start Focus near      | This command starts to focus towards near. The Visualizer changes the focus until the „Stop Zoom/Focus/Iris“-command or a different Start-Command is received (or mechanical end-position is reached).  |           |
| 0    | 128       | \$80      | Stop Zoom/Focus/Iris  | This command stops zooming, focusing, iris and mirror-movement (if activated with the respective „Start xxx“-command before).   |           |
| 0    | 163       | \$A3      | Get Focus-Position    | After sending this command the Visualizer sends back the current focus-position as a 3-digit hexadecimal number in the range from '000' (near) to 'FFF' (far) as an ASCII-string followed by LF + CR.   | 3, 4      |
| 0    | 164       | \$A4      | Set Focus-Position    | After this command the Visualizer echoes a question-mark ('?') with no LF + CR. After this question mark the controller should send the desired focus-position as 3-digit hexadecimal number in the range from '000' (near) to 'FFF' (far) within max. 3 seconds. No CR or LF is needed. After receiving the 3rd digit the Visualizer moves to this position. | 3, 4      |
| 0    | 249       | \$F9      | Focus Working Surface | By sending this command the Visualizer focuses onto working surface level (pre-set).  |           |

## Iris Control

| Page | Dec. Code | Hex. Code | Command                         | Description  | see Notes  |
|------|-----------|-----------|---------------------------------|--|------------|
| 0    | 193       | \$C1      | Iris open /<br>Brightness up    | By sending this command the Visualizer opens the iris. For continuous opening the iris, send this code repetitively (min. 10Hz) as long as you want to open iris.  | 5, 6       |
| 0    | 197       | \$C5      | Iris close /<br>Brightness down | By sending this command the Visualizer closes the iris. For continuous closing the iris, send this code repetitively (min. 10Hz) as long as you want to close iris.  | 5, 6       |
| 0    | 133       | \$85      | Start Iris open                 | This command starts to open the iris. The Visualizer opens the iris until the „Stop Zoom/Focus/Iris“-command or a different Start-Command is received (or mechanical end-position is reached).   | 5, 6       |
| 0    | 134       | \$86      | Start Iris close                | This command starts to close the iris. The Visualizer closes the iris until the „Stop Zoom/Focus/Iris“-command or a different Start-Command is received (or mechanical end-position is reached).   | 5, 6       |
| 0    | 128       | \$80      | Stop<br>Zoom/Focus/Iris         | This command stops zooming, focusing, iris and mirror-movement (if activated with the respective „Start xxx“-command before).  |            |
| 0    | 167       | \$A7      | Auto Iris on                    | Switches the Auto Iris on.   |            |
| 0    | 168       | \$A8      | Auto Iris off                   | Switches the Auto Iris off.  |            |
| 0    | 166       | \$A6      | Get Auto Iris                   | This function returns '1'+LF+CR if the Auto Iris is switched on and '0'+LF+CR if the Auto Iris is switched off.  | 4          |
| 0    | 165       | \$A5      | Get Iris-Position               | After sending this command the Visualizer sends back the current iris-position as a 3-digit hexadecimal number in the range from '000' (close) to 'FFF' (open) as an ASCII-string followed by LF + CR.   | 3, 4, 5    |
| 0    | 169       | \$A9      | Set Iris-Position               | After this command the Visualizer echoes a question-mark ('?') with no LF + CR. After this question mark the controller should send the desired iris-position as 3-digit hexadecimal number in the range from '000' (close) to 'FFF' (open) within max. 3 seconds. No CR or LF is needed. After receiving the 3rd digit the Visualizer moves to this position. | 3, 4, 5, 6 |

## Telescope Arm Control

| Page | Dec. Code | Hex. Code | Command  | Description   | see Notes |
|------|-----------|-----------|----------|---|-----------|
| 0    | 140       | \$8C      | Arm Down | By sending this command the telescope arm moves down.<br>If the unit is switched on before, then it switches into the standby-mode and the telescope arm moves down.  |           |
| 0    | 141       | \$8D      | Arm Up   | By sending this command the telescope arm moves up.   |           |
| 0    | 187       | \$BB      | Arm      | By sending this command the telescope arm moves up if the arm is down, or moves down if the arm is up (If the unit is switched on before, then it switches into the standby-mode and the telescope arm moves down.).                        |           |
| 0    | 184       | \$B8      | Get Arm  | This function returns '0'+LF+CR if the Arm is down, '1'+LF+CR if the Arm is up, '2'+LF+CR if the Arm is on Macro 11x position, '3'+LF+CR if the Arm is on Macro 12x position and '4'+LF+CR is undefined (e.g. the arm moves at the moment). | 4         |

## Mirror Control

| Page | Dec. Code | Hex. Code | Command              | Description   | see Notes |
|------|-----------|-----------|----------------------|---|-----------|
| 0    | 190       | \$BE      | Mirror Down          | By sending this command the mirror moves down.  |           |
| 0    | 191       | \$BF      | Mirror Up            | By sending this command the mirror moves up.  |           |
| 0    | 135       | \$87      | Start Mirror Up      | This command starts the mirror movement upward. The mirror moves until the „Stop all start/stop- command“- or a different Start-Command is received (or mechanical end-position is reached).  |           |
| 0    | 136       | \$88      | Start Mirror Down    | This command starts the mirror movement downward. The mirror moves until the „Stop all start/stop- command“- or a different Start-Command is received (or mechanical end-position is reached).  |           |
| 0    | 128       | \$80      | Stop Zoom/Focus/Iris | This command stops zooming, focusing, iris and mirror-movement (if activated with the respective „Start xxx“-command before).   |           |
| 0    | 181       | \$B5      | Get Mirror-Position  | After sending this command the Visualizer sends back the current mirror-position as a 3-digit hexadecimal number in the range from '000' (down) to 'FFF' (up) as an ASCII-string followed by LF + CR.   | 3, 4      |
| 0    | 182       | \$B6      | Set Mirror-Position  | After this command the Visualizer echoes a question-mark ('?') with no LF + CR. After this question mark the controller should send the desired mirror-position as 3-digit hexadecimal number in the range from '000' to 'FFF' within max. 3 seconds. No CR or LF is needed. After receiving the 3rd digit the mirror of the Visualizer moves to this position. | 3, 4      |

## Light On/Off Control

| Page | Dec. Code | Hex. Code | Command                 | Description  | see Notes |
|------|-----------|-----------|-------------------------|--|-----------|
| 0    | 204       | \$CC      | Light on toggle switch  | By sending this command the Visualizer switches the light on. If the light was already on, the light box is switched on and the light is switched off.   |           |
| 0    | 205       | \$CD      | Light off               | By sending this command the Visualizer switches the light and the light box off.   |           |
| 0    | 178       | \$B2      | Light on, Light Box off | This command switches the light on and the light box off.  |           |
| 0    | 179       | \$B3      | Light Box on, Light off | This command switches the light box on and the light off.  |           |
| 0    | 172       | \$AC      | Get Light on or off     | This function returns '1'+LF+CR if the light is switched on and '0'+LF+CR if the light is switched off.  | 4         |
| 0    | 180       | \$B4      | Get Light Box on or off | This function returns '1'+LF+CR if the light box is switched on and '0'+LF+CR if the light box is switched off.  | 4         |
| 0    | 188       | \$BC      | Light toggle switch     | By sending this command the Visualizer switches the light on. If the light was already on, the light box is switched on and the light is switched off. If the light box is already on, the light box and intern light is switched off. |           |

## Power / Presets Control

| Page | Dec. Code | Hex. Code | Command                    | Description   | see Notes   |
|------|-----------|-----------|----------------------------|---|-------------|
| 0    | 200       | \$C8      | Power on / Factory-Preset  | If the Visualizer is in standby-mode, the unit is switched on. Then the factory-preset is recalled (even if the unit was already switched on). (approx. DIN A5, Light on) | 7, 8, 9, 10 |
| 0    | 201       | \$C9      | Power off                  | This command puts the unit in standby-mode (camera, light, etc. are switched off).  |             |
| 0    | 171       | \$AB      | Get Power on or off        | This function returns '1'+LF+CR if the power is switched on and '0'+LF+CR if the unit is in standby-mode.   | 4           |
| 0    | 186       | \$BA      | Power toggle switch        | By sending this command the Visualizer switches on if it is off, or switches off if the Visualizer is on. (The main switch must be on.)                                   |             |
| 0    | 154       | \$9A      | Recall Preset              | This command sends "?" back and waits for character input "1"- "9" for preset number. Then the Preset recalls. (max. 3 seconds time for the character input)              | 9           |
| 0    | 155       | \$9B      | Store Preset               | This command sends "?" back and waits for character input "1"- "9" for preset number. Then the Preset stores. (max. 3 seconds time for the character input)               | 9           |
| 0    | 213       | \$D5      | Preset 0<br>Factory-Preset | This command recalls the Factory-Preset. (approx. DIN A5, Light on)   | 7, 8, 9     |
| 0    | 202       | \$CA      | Preset 1                   | This command recalls Preset 1.  | 9           |
| 0    | 203       | \$CB      | Preset 2                   | This command recalls Preset 2.  | 9           |
| 0    | 253       | \$FD      | Preset 3                   | This command recalls Preset 3.  | 9           |
| 0    | 216       | \$D8      | Save Preset 1              | This command stores the current Visualizer-settings as Preset 1.  | 9           |
| 0    | 217       | \$D9      | Save Preset 2              | This command stores the current Visualizer-settings as Preset 2.  | 9           |
| 0    | 254       | \$FE      | Save Preset 3              | This command stores the current Visualizer-settings as Preset 3.  | 9           |
| 0    | 229       | \$E5      | Preset Max. Wide           | This command zooms to the maximum wide position, light is switched on.  | 7, 8        |
| 0    | 230       | \$E6      | Preset DIN A4              | This command zooms to approx. DIN A4-size, light is switched on.  | 7, 8, 10    |
| 0    | 231       | \$E7      | Preset DIN A5              | This command zooms to approx. DIN A5-size, light is switched on.  | 7, 8, 10    |
| 0    | 232       | \$E8      | Preset DIN A6              | This command zooms to approx. DIN A6-size, light is switched on.  | 7, 8, 10    |
| 0    | 233       | \$E9      | Preset DIN A7              | This command zooms to approx. DIN A7-size, light is switched on.  | 7, 8, 10    |
| 0    | 234       | \$EA      | Preset DIN A8              | This command zooms to approx. DIN A8-size, light is switched on.  | 7, 8, 10    |
| 0    | 235       | \$EB      | Preset Max. Tele           | This command zooms to the maximum tele position, light is switched on.  | 7, 8        |

| Page | Dec. Code | Hex. Code | Command                         | Description  | see Notes   |
|------|-----------|-----------|---------------------------------|--|-------------|
| 0    | 236       | \$EC      | Preset Slide                    | This command zooms to approx. slide-film size, light is switched off and the light box is switched on. | 7, 8        |
| 0    | 237       | \$ED      | Preset X-ray<br>DINA4-LightBox  | This command zooms to approx. DIN A4-size, the light box is switched on.                               | 7, 8,<br>10 |
| 0    | 238       | \$EE      | Preset X-ray<br>DIN A5-LightBox | This command zooms to approx. DIN A5-size, the light box is switched on.                               | 7, 8,<br>10 |

## Visualizer Menu, Camera control

| Page | Dec. Code | Hex. Code | Command  | Description   | see Notes |
|------|-----------|-----------|--|---|-----------|
| 0    | 218       | \$DA      | Unlock Visualizer-Menu                         | This command unlocks the Visualizer-menu. After sending this command the menu can be entered by sending 206.  |           |
| 0    | 206       | \$CE      | Visualizer-Menu on/off                         | This command enters the Visualizer menu (can be unlocked with 218!) which is then displayed on the screen. If the Menu is locked, then send this code 1 sec. with 10 Hz (repetitively). By sending this command again, the menu disappears and is locked again. |           |
| 0    | 139       | \$8B      | Unlock Extra-Menu (Baud rate)                  | This command unlocks the Visualizer-extra-menu. After sending this command the menu can be entered by sending 206.  | 11        |
| 0    | 207       | \$CF      | Color Bars On/Off VZ-37, VZ-47 and VZ-57 only) | This command display color bars on the screen. By sending this command again, the color bars will be deactivated and the live image will be displayed.  | 12        |
| 0    | 208       | \$D0      | Function Up                                    | Moves the menu-cursor up (if the menu is activated).  |           |
| 0    | 209       | \$D1      | Function Down                                  | Moves the menu-cursor down (if the menu is activated).  |           |
| 0    | 210       | \$D2      | Data Right / White Balance                     | Changes the data of the current menu-item if the menu is activated. If the menu is not activated, a white-balance is performed.   |           |
| 0    | 151       | \$97      | White Balance                                  | By sending this command the camera performs a white balance. (Also works, when the menu is on.)   |           |
| 0    | 211       | \$D3      | Data Left / Text Enhancer On/Off               | Changes the data of the current menu-item if the menu is activated. If the menu is not activated, the Text Enhancer is toggled (switched on or off).  |           |
| 0    | 150       | \$96      | Text Enhancer On/Off                           | By sending this command the Visualizer switches the Text Enhancement on. If the Text Enhancement is already on, it is switched off. (Also works, when the menu is on.)  |           |
| 1    | 158       | \$9E      | Text Enhancer On                               | This command switches the Text Enhancement mode On.   | 1         |
| 1    | 159       | \$9F      | Text Enhancer Off                              | This command switches the Text Enhancement mode Off.  | 1         |
| 1    | 160       | \$A0      | Get Text Enhancer                              | This function returns '1'+LF+CR if the Text Enhancement mode is active and '0'+LF+CR if the Text Enhancement mode is inactive.  | 1         |
| 0    | 214       | \$D6      | Help   | This command gives a description off the settings in the Visualizer-on-screen-menu.   |           |
| 0    | 220       | \$DC      | Data Left + Data Right                         | This command behaves like if you press Data Right and Left together, i.e. the menu-item is preset to the default value.   |           |
| 0    | 245       | \$F5      | Toggle Sync-On-Green On/Off                    | This command toggles Sync-On-Green (switches on or off). On VZ-27 and VZ-57, it doesn't works when resolution is set to "AUTO".   |           |

| Page | Dec. Code | Hex. Code | Command                                   | Description  | see Notes |
|------|-----------|-----------|---|--|-----------|
| 1    | 161       | \$A1      | Get Sync-On-Green                         | This returns '1'+LF+CR if the Sync-On-Green mode is active and '0'+LF+CR if the Sync-On-Green mode is inactive.  | 1         |
| 0    | 246       | \$F6      | Reset Menu                                | This command resets all Visualizer-settings except output settings.<br>VZ-37: RGB/YUV<br>VZ-47: CS / HD/VD<br>VZ-27/VZ-57: output resolution and refresh rate  |           |
| 0    | 247       | \$F7      | Switch YUV On/Off (VZ-37 only)            | This command changes to YUV-output when the unit is in RGB-mode and to RGB-mode when YUV was active.   | 12        |
| 0    | 248       | \$F8      | Toggle CSync and HD/VD (VZ-27/47/57 only) | This command toggles between CS (Composite Sync, normal video-sync-signal on S-output) and HD/VD (separate sync-signals for horizontal- and vertical sync on HD- and VD-outputs).<br>On VZ-27 and VZ-57, it doesn't work when resolution is set to "AUTO". | 14        |
| 1    | 162       | \$A2      | Get Sync-On-Green                         | This command changes to YUV-output when the unit is in RGB-mode and to RGB-mode when YUV was active.   | 1         |

## Reply Mode Control

| Page | Dec. Code | Hex. Code | Command         | Description  | see Notes     |
|------|-----------|-----------|-----------------|--|---------------|
| 0    | 156       | \$9C      | Reply Mode Off  | By sending this command the Visualizer changes to the "no reply mode". In this mode the unit does not send a reply when a command is received. This is the default mode after power on the unit (mains).   | 16, 17        |
| 0    | 157       | \$9D      | Reply One Byte  | By sending this command the Visualizer changes to the "one byte-reply mode". In this mode a byte is replied after each command that is received via the serial interface. If a valid command was received, the byte \$06 is replied. If an invalid command was received \$0F is replied. The Visualizer replies also a command if you send only the page select command. | 16, 17, 18    |
| 0    | 158       | \$9E      | Reply Two Bytes | By sending this command the Visualizer changes to the "two byte-reply mode". This mode is similar to one byte-reply mode except that the byte which was just received is repeated before the \$06 or \$0F. e.g. if the Visualizer receives \$C8 (i.e. Power On) it replies \$C8 \$06. If it receives \$10 (i.e. an invalid command) it replies \$10 \$0F.                | 16, 17, 18    |
| 0    | 159       | \$9F      | Reply String    | By sending this command the Visualizer changes to the "string-reply mode". In this mode the Visualizer replies 'OKAY'+LF+CR if a valid command was received or 'ERROR'+LF+CR if an invalid command was received.   | 4, 16, 17, 18 |

## Miscellaneous Commands

| Page | Dec. Code | Hex. Code | Command   | Description   | see Notes |
|------|-----------|-----------|---|---|-----------|
| 0    | 032       | \$20      | Blank-Echo (' ')                                  | This command (\$20 is the ASCII-value of a blank) echoes a blank (' ', without CR or LF) back to the controller. This may be useful for checking if the Visualizer is ready for receiving commands.   | 4         |
| 0    | 118       | \$76      | Visualizer-Type and Software-Version output ('v') | This command returns the Visualizer-Type and the version no. of the built-in Software (EPROM-version) back to controller. The output-format is as follows: e.g.: 'VZ-17 V1.10b'+LF+CR or 'VZ-57 V1.20b'+LF+CR   | 4, 19     |
| 0    | 095       | \$5F      | ASCII ('_')                                       | This command initiates direct ASCII-text input: After receiving '_', the Visualizer responds with a question-mark. After that you have to send the three-digit decimal-number of the desired command within three seconds. These three digits are echoed back by the Visualizer. This command will then be performed. (No CR or LF is needed.) This is useful for testing commands with a standard terminal-program.  |           |
| 0    | 175       | \$AF      | Key Lock On                                       | This command activates the Key Lock. When the Key Lock is active the Visualizer can only be controlled via RS-232 and not with the IR-remote-control or the keys on the unit.   |           |
| 0    | 176       | \$B0      | Key Lock Off                                      | This command deactivates the Key Lock. When the Key Lock is inactive the Visualizer can be normally operated with the keys on the unit, the IR-remote-control or via RS-232.  |           |
| 0    | 174       | \$AE      | Get Key Lock                                      | This function returns '1'+LF+CR if Key Lock is active and '0'+LF+CR if the Key Lock is inactive.  | 4         |
| 0    | 160       | \$A0      | Get Status  | This command returns all settings of the Visualizer in following format: 'Zoom:47D DigitalZoom:000 Focus:370 Iris:E46 Mirror:C325 Macro:11x Power:1 Arm:1 Image:1 AI:1 Light:1 LightBox:0 KeyLock:0 ImageTurn:0 ShowAll:0 Negative:0 Black/White:0 Text:0 Resolution:AUTO-XGA-75Hz Video:PAL SyncOnGreen:0 CSync:0 Lamp1Blown:0 Lamp2Blown:0 OSD-Menu:0'+LF+CR (in one line) (The Values are for example only, '1' means that the respective item is on, '0' means that it is off. The zoom/iris/focus/mirror-positions are 3 digit HEX-numbers in the range from 000 to FFF.) In the future further items may be added. Therefore you should search for a specific item-string (e.g. 'Light:') within the complete string and then analyze the next character(s). GetStatus-messages are depending on Visualizer model and installed firmware version! | 3, 4, 20  |

| Page | Dec. Code | Hex. Code | Command                     | Description   | see Notes |
|------|-----------|-----------|-----------------------------|---|-----------|
| 0    | 221       | \$DD      | Switch IR-Mode              | This command switches between IR-mode A, B, C and D (,A, B, ..). It's useful if you have up to four Visualizers close together with separate remote-controls.   |           |
| 0    | 244       | \$F4      | Demo-Mode                   | This command starts the demo-mode. In this mode the Visualizer demonstrates some of its functions, i.e. it continuously zooms, switches the image off and on, etc. To exit the demo-mode, send any code or press any key. |           |
| 1    | 128       | \$80      | Toggle Switch Intern/Extern | This command switches between the Visualizer image and the image from e.g. computer that is connected to the "Extern" connector.  |           |
| 1    | 129       | \$81      | Switch Extern signal On     | This command switches the extern connected e.g. Computer image to the Visualizer output.  |           |
| 1    | 130       | \$82      | Switch Intern signal On     | This command activates the output of the Visualizer image.  |           |
| 1    | 131       | \$83      | Get Extern                  | This function returns '1'+LF+CR if the Extern signal is active and '0'+LF+CR if the Extern signal is inactive.  |           |

## Image Turn Commands

| Page | Dec. Code | Hex. Code | Command                | Description  | see Notes |
|------|-----------|-----------|------------------------|--|-----------|
| 1    | 132       | \$84      | Switch Portrait On/Off | This command toggles the Image turn mode (behaves same as the Image Turn key). (Portrait-/Landscape mode).   | 1, 21     |
| 1    | 133       | \$85      | Portrait On            | This command activates the image turn mode On (+/-90° or 180°).  | 1, 21     |
| 1    | 134       | \$86      | Portrait Off           | This command activates the image turn mode Off.  | 1         |
| 1    | 135       | \$87      | Get Portrait           | When the portrait mode is active (turned by -90°, 180° or +90°) this command returns '1'+LF+CR. When the portrait mode is inactive (0°), this command returns '0'+LF+CR. | 1         |

## Video Output Commands

| Page | Dec. Code | Hex. Code | Command    | Description  | see Notes |
|------|-----------|-----------|------------|--|-----------|
| 1    | 148       | \$94      | Video PAL  | This command switches the Video output format to PAL.  | 1         |
| 1    | 149       | \$95      | Video NTSC | This command switches the Video output format to NTSC.   | 1         |
| 1    | 150       | \$96      | Get Video  | This function returns 'PAL'+LF+CR if the PAL mode is active and 'NTSC'+LF+CR if the NTSC mode is active. | 1         |

## Output Resolution Commands

| Page | Dec. Code | Hex. Code | Command           | Description  | see Notes |
|------|-----------|-----------|-------------------|--|-----------|
| 1    | 144       | \$90      | Resolution UP     | This command switches the Output resolution on both outputs up.  | 1         |
| 1    | 145       | \$91      | Resolution Down   | This command switches the Output resolution on both outputs down.  | 1         |
| 1    | 146       | \$92      | Resolution XGA/75 | This command switches the Output resolution to AUTO-detect.  | 1         |
| 1    | 147       | \$93      | Get Resolution    | This function returns the current resolution setting.<br>E.g. "XGA at 75Hz" for XGA-standard at 75Hz refresh rate. | 1         |

## Output Signal Setting Commands

| Page | Dec. Code | Hex. Code | Command                    | Description  | see Notes |
|------|-----------|-----------|----------------------------|--|-----------|
| 1    | 151       | \$97      | Switch Positive On         | This command switches to the positive image mode.  | 1         |
| 1    | 152       | \$98      | Switch Negative On         | This command switches to the negative image mode.  | 1         |
| 1    | 153       | \$99      | Switch Negative Blue On    | This command switches to negative blue image mode.   | 1         |
| 1    | 154       | \$9A      | Get Positive/Negative      | This function returns '0'+LF+CR if the Positive mode is active, '1'+LF+CR for the Negative mode and '2'+LF+CR for the Negative /Blue mode. | 1         |
| 1    | 155       | \$9B      | Switch Color On            | This command switches the color image On.  | 1         |
| 1    | 156       | \$9C      | Switch Black/White mode On | This command switches the image to a black/white image.  | 1         |
| 1    | 157       | \$9D      | Get Black/White            | This function returns '0'+LF+CR if the Color-mode is active and '1'+LF+CR if the Black/White mode is active.                               | 1         |

## Image Storing Commands

| Page | Dec. Code | Hex. Code | Command         | Description   | see Notes |
|------|-----------|-----------|-----------------|---|-----------|
| 1    | 140       | \$8C      | Memory Store x  | This command sends "?" back and wait for character input "1"- "9" for memory number. Then the Memory stores (max. 3 seconds time for the character input).  | 1         |
| 1    | 141       | \$8D      | Memory Recall x | This command sends "?" back and wait for character input "1"- "9" for memory number. Then the Memory recalls (max. 3 seconds time for the character input). | 1         |
| 1    | 142       | \$8E      | Memory Off      | This command switches to the Live image.  | 1         |
| 1    | 143       | \$8F      | Snapshot        | This command stores one memory after the other memory, until all 9 memories are stored.   | 1, 22     |
| 1    | 136       | \$88      | Show All On/Off | This command toggles the Show All mode. (If this function is activated, the Visualizer is showing all stored images on the screen at the same time).        | 1         |
| 1    | 137       | \$89      | Show All On     | This command switches the Show All Memories mode On.  | 1         |
| 1    | 138       | \$8A      | Show All Off    | This command switches the Show All Memories mode Off.   | 1         |
| 1    | 139       | \$8B      | Get Show All    | This function returns '1'+LF+CR if the Show All memories mode is active and '0'+LF+CR if the Show All memories mode is inactive.                            | 1         |
| 1    | 165       | \$A5      | Erase Memory    | This command erases all stored memories.  | 1, 23     |
| 0    | 215       | \$D7      | Freeze On/Off   | This command toggles the Freeze-Mode  | 15        |

## Image On/Off Control

| Page | Dec. Code | Hex. Code | Command             | Description   | see Notes |
|------|-----------|-----------|---------------------|---|-----------|
| 0    | 185       | \$B9      | Image toggle switch | By sending this command, the Visualizer toggles between image OFF and image ON.                             |           |
| 0    | 170       | \$AA      | Get Image On/Off    | This function returns '1'+LF+CR when the image is switched on and '0'+LF+CR when the image is switched off. | 4         |
| 0    | 192       | \$C0      | Image on            | By sending this command the Visualizer switches the image on.   |           |
| 0    | 196       | \$C4      | Image off           | By sending this command the Visualizer switches the image off.  |           |

## Notes

1. Available on VZ-27 and VZ-57 only. For more details about the page-command, see page 2.
2. Zooming switches on Auto-Iris.
3. Not all zoom/focus/iris, telescope arm and mirror-positions in the range from 000 to FFF are supported („missing codes“). Reading the position always returns the exact position. Setting the position moves to the desired position as exact as possible.
4. Text under 'quotation marks' are ASCII-strings. The quotation marks must not be sent to the Visualizer and are not sent by the Visualizer. CR means Carriage Return (\$0D), LF is for Line Feed (\$0A).
5. The Auto Shutter, Auto Iris and dimming are not considered.
6. Changing the iris switches off the Auto Iris.
7. These presets are pre-defined and cannot be modified. Focus is set to the working-plate, Auto Iris and image are switched on, and Text Enhancer is off.
8. The exact size of the picture depends very much on the adjustments of the monitor / projector.
9. Following Visualizer-settings are stored/recalled: Zoom-Position, Focus-Position, Auto Iris on/off, Iris-Position (if AI off), Image on/off, Light on/off, Light box on/off, Text Enhancer on/off.
10. DIN A8 = 52mm x 74mm [≈2" x 2.9"], DIN A7 = 74mm x 105 [≈2,9" x 4.1"], DIN A6 = 105mm x 148mm [≈4.1" x 5.8"], DIN A5 = 148mm x 210mm [≈5.8" x 8.3"] and DIN A4 = 210 x 297mm [≈8.3" x 11.7"]
11. In this sub-menu it's possible to change the Baud rate of the Visualizer.
12. Available on VZ-37/47/57 only. The color bars may helpful for projector or monitor adjustment.
13. Available on VZ-37 only.
14. Available on VZ-27, VZ-47 and VZ-57 only.
15. Available on VZ-47 only.
16. The verification if a command is valid or invalid is only done very roughly. E.g. if the Visualizer receives a zoom-command while the unit is in standby-mode, it recognizes a valid command and replies \$06 although the unit doesn't perform any action.
17. The reply mode is changed immediately after the respective command was received. This means that the new reply mode is already active for the command that changed the reply mode, i.e. after \$9C there is never a reply, after \$9F the Visualizer always sends 'OKAY'+LF+CR, etc. Also the VZ-17 identifies command code that are supported on VZ-37 as a valid code.
18. The reply is always sent immediately after a command is received. When a command returns a status, this status is returned after the reply. E.g.: Reply mode = String Mode, Auto Iris = on: When the Visualizer receives \$A6 (i.e. Get Auto Iris) the unit replies 'OKAY'+LF+CR+'1'+LF+CR.
19. The current released version no. of today will be found on: <http://www.wolfvision.com/wolf/fware.html>.
20. Status messages are depending on Visualizer model and installed firmware. Lamp status and on-screen menu status are available on VZ-27 and VZ-57 only and added since firmware version V1.44g.
21. Image rotation depends on the settings in the on-screen menu (miscellaneous settings): "+90°", "180°", "-90°" or "cycle".
22. With firmware version V1.32a or lower, you have to send "recall memory 1" to start the snapshot function.
23. Possible with firmware V1.33a and later only.

## Commands of other Visualizers, Future

The serial protocols of all WolfVision Visualizers are almost the same. Only some commands more or less are supported on other Visualizer-types due to the different technologies.

(The VZ-7D has e.g. Auto Focus commands but no e.g. Sync-On-Green-command.)

In the future (at higher EPROM-versions) further commands may be added which are not supported yet.