

# Duet Module Interface Specification

for

# WolfVision Visualizers

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## REVISION HISTORY

Date	Init.	Comments
Apr-13-2006	HG	V1.0.0 – New Duet module!
Jun-30-2006	HG	V1.1.0 (Device Revision still 1.0.0) – Added support for VZ-8light <sup>2</sup> and VZ-8plus <sup>2</sup> devices
Oct-11-2006	HG	V1.2.0 (Device Revision still 1.0.0) – Added support for VZ-9plus, VZ-27plus <sup>2</sup> and VZ-C12 <sup>2</sup> devices
Nov-17-2006	HG	V1.2.1 (Device Revision still 1.0.0) – Only minor change in the Duet module (no change of API)

## **Introduction**

This is a reference manual to describe the interface provided between an AMX NetLinx system and all kinds of WolfVision Visualizers. Every Visualizer supports an RS-232 serial protocol. The interface was tested on a VZ-8plus, VZ-9, and VZ-57plus. The required communication settings are a baud rate of 9600, 8 data bits, no parity, 1 stop bit, and handshaking off. Control was tested using a standard RS-232 null modem cable (AMX Part number is FG10-756-04). The wiring for this cable is as follows:

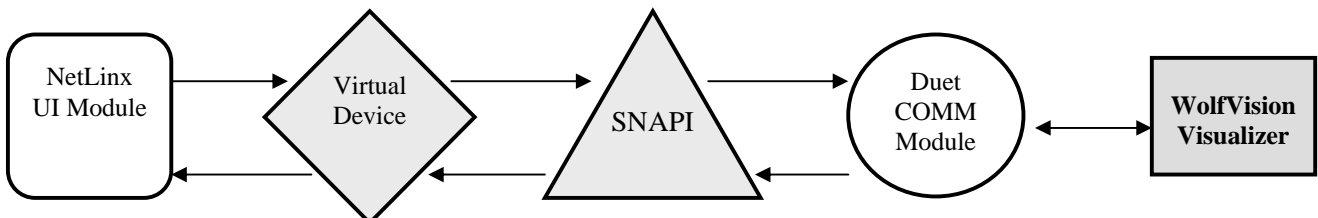
AMX NI	Visualizer (9-pin Sub-D-connector)
(Gnd) 5	(Gnd) 5
(Tx) 3	(Rx) 2
(Rx) 2	(Tx) 3

## **Overview**

The COMM module translates between the standard interface described below and the WolfVision's serial protocol. It parses the buffer for responses from the Visualizer, sends strings to control the Visualizer, and receives commands from the UI module or telnet sessions.

A User Interface (UI) module is also provided. This module uses the standard interface described below and parses the command responses for feedback.

The following diagram gives a graphical view of the interface between the interface code and the Duet module.



Some functionality in the device interface may not be implemented in the API interface. In cases where device functions are desired but not API-supported, the PASSTHRU command may be used to send any and all device-protocol commands to the device. See the PASSTHRU command and the [Adding Functions to Modules](#) section for more information.

A sample UI module and a touch panel file are provided in the module package. These are not intended to cover every possible application, but can be expanded as needed by a dealer to meet the requirements of a particular installation.

## **Implementation**

To interface to the WolfVision\_VZ\_Comm\_dr1\_0\_0.jar module, the programmer must perform the following steps:

1. Define the device ID for the WolfVision Visualizer that will be controlled.
2. Define the virtual device ID that the Visualizer's COMM module will use to communicate with the main program and User Interface. Duet virtual devices use device numbers 41000 - 42000.
3. If a touch panel interface is desired, a touch panel file WolfVision\_VZ57plus\_UI.tp4 and module (WolfVision\_VZ57plus\_UI.axs) have been created for testing.
4. The Duet WolfVision module may be included in the program with a DEFINE\_MODULE command or for using with the AMX dynamic device discovery with the STATIC\_PORT\_BINDING or DYNAMIC\_APPLICATION\_DEVICE and DYNAMIC\_POLLED\_PORT commands. These commands start the execution of the module or the AMX dynamic device discovery algorithm.

An example of how to use this module in a static way is shown below.

```
DEFINE_DEVICE
dvTP      = 10001:1:0    // The touch panel used for output
dvDocCam   = 5001:1:0    // The Visualizer connected to the NetLinx on 1st RS-232 port
vdvDocCam  = 41001:1:0    // The virtual device use for communication between the
                          // Comm module interface and User Interface (UI) module interface

DEFINE_CONSTANT
// Define an array of button IDs used on the TP
INTEGER nBtns[] = { 31, 32, ... }
// Define an array of level IDs used on the TP
INTEGER nLvls[] = { 101, 102, 103, 104 }

DEFINE_VARIABLE
// Comm module
DEFINE_MODULE 'WolfVision_VZ_Comm_dr1_0_0' docCam (vdvDocCam, dvDocCam)
// Touch panel module
DEFINE_MODULE ' WolfVision_VZ59plus_UI ' UI (vdvDocCam, nBtns, nLvls, dvTP)

DEFINE_START
```

Upon initialization the COMM module will communicate with the Visualizer and information will be exchanged.

An example of how to use this module with the AMX dynamic device discovery is shown below.

```
DEFINE_DEVICE
dvTP      = 10001:1:0    // The touch panel used for output
dvDocCam  = 5001:1:0    // The Visualizer connected to the NetLinx on 1st RS-232 port
vdvDocCam = 41001:1:0    // The virtual device use for communication between the
                        // Comm module interface and User_Interface (UI) module interface

DEFINE_CONSTANT
// Define an array of button IDs used on the TP
INTEGER nBtns[] = { 31, 32, ... }
// Define an array of level IDs used on the TP
INTEGER nLvls[] = { 101, 102, 103, 104 }

DEFINE_VARIABLE
// Touch panel module
DEFINE_MODULE ' WolfVision_VZ57plus_UI ' UI (vdvDocCam, nBtns, nLvls, dvTP)

DEFINE_START
STATIC_PORT_BINDING (vdvDocCam, dvDocCam, DUET_DEV_TYPE_DOCUMENT_CAMERA, 'VZ-57plus',
DUET_DEV_POLLED)
```

## **Dynamic Device Discovery Protocol (DDDP)**

This Duet module has been verified for Dynamic Device Discovery Protocol (DDDP) with the manufacturer's device. When the device is plugged into the NetLinx system, this Duet module can be automatically loaded to the NetLinx master from the InConcert database, the manufacturer's website or from the device itself. Alternatively, the Duet module may be downloaded to the NetLinx master by including the module in the NetLinx project or by manually downloading the module to the NetLinx master using the master's web server. Please consult the NetLinx Controller Installation Manual for additional details.

## **Port Mapping**

Virtual Device	Channels	Levels	Control	Feedback
41001:1:0 – Visualizer	All Channels	All Levels	All Control Commands	All Feedback Commands

**Table 1 – Port Mapping**

## **Channels**

The UI module controls the WolfVision Visualizer via channel events (NetLinx commands *pulse*, *on*, and *off*) sent to the COMM module. The channels supported by the COMM module are listed below. These channels are associated with the virtual devices and are independent of the channels associated with the touch panel device.

Channel	Description
<b>9</b>	PULSE: Cycle Power
<b>27</b>	PULSE: Power On
<b>28</b>	PULSE: Power Off
<b>158</b>	ON: Ramp Zoom Out (Wide) – provides Feedback also OFF: Stop ramping Zoom – provides Feedback also
<b>159</b>	ON: Ramp Zoom In (Tele) – provides Feedback also OFF: Stop ramping Zoom – provides Feedback also
<b>160</b>	ON: Ramp Focus Near – provides Feedback also OFF: Stop ramping Focus – provides Feedback also
<b>161</b>	ON: Ramp Focus Far – provides Feedback also OFF: Stop ramping Focus – provides Feedback also
<b>162</b>	ON: Auto Focus On – provides Feedback also OFF: Auto Focus Off – provides Feedback also
<b>163</b>	ON: Auto Iris On – provides Feedback also OFF: Auto Iris Off – provides Feedback also
<b>172</b>	PULSE: Cycle Auto Focus
<b>173</b>	PULSE: Cycle Auto Iris
<b>174</b>	ON: Ramp Iris Open – provides Feedback also OFF: Stop ramping Iris – provides Feedback also
<b>175</b>	ON: Ramp Iris Close – provides Feedback also OFF: Stop ramping Iris – provides Feedback also
<b>176</b>	PULSE: Cycle Light (upper light on -> lower light on -> all off)
<b>197</b>	ON: Lower Light On (switches off upper light if on) – provides Feedback also OFF: Lower Light Off – provides Feedback also
<b>198</b>	ON: Upper Light On (switches off lower light if on) – provides Feedback also OFF: Upper Light Off – provides Feedback also
<b>251</b>	ON: Device is Online – Feedback only OFF: Device is not Online – Feedback only

<b>252</b>	ON: Data Initialized – Feedback only OFF: Data Not Initialized – Feedback only
<b>255</b>	ON: Power On – provides Feedback also OFF: Power Off – provides Feedback also
<b>300</b>	ON: Ramp Mirror Up – provides Feedback also OFF: Stop ramping Mirror – provides Feedback also
<b>301</b>	ON: Ramp Mirror Down – provides Feedback also OFF: Stop ramping Mirror – provides Feedback also
<b>302</b>	ON: Menu On – Feedback only OFF: Menu Off – Feedback only
<b>303</b>	PULSE: Execute Menu Up command
<b>304</b>	PULSE: Execute Menu Down command
<b>305</b>	PULSE: Execute Menu Left command
<b>306</b>	PULSE: Execute Menu Right command
<b>307</b>	ON: Help within Menu On – provides Feedback also OFF: Help within Menu Off – provides Feedback also
<b>308</b>	ON: Text Enhancer On – provides Feedback also OFF: Text Enhancer Off – provides Feedback also
<b>309</b>	ON: Key Lock On – provides Feedback also OFF: Key Lock Off – provides Feedback also
<b>310</b>	ON: External Input On – provides Feedback also OFF: External Input Off – provides Feedback also
<b>311</b>	ON: Image Mute On – provides Feedback also OFF: Image Mute Off – provides Feedback also
<b>312</b>	ON: Image Turn On – provides Feedback also OFF: Image Turn Off – provides Feedback also
<b>313</b>	ON: Black/White On – provides Feedback also OFF: Black/White Off – provides Feedback also
<b>314</b>	ON: Show All Memories On – provides Feedback also OFF: Show All Memories Off – provides Feedback also
<b>315</b>	ON: Freeze On – provides Feedback also OFF: Freeze Off – provides Feedback also
<b>316</b>	PULSE: Execute White Balance
<b>317</b>	ON: Lamp 1 is Blown – Feedback only OFF: Lamp 1 is OK – Feedback only
<b>318</b>	ON: Lamp 2 is Blown – Feedback only OFF: Lamp 2 is OK – Feedback only
<b>319</b>	ON: CSync On – Feedback only OFF: CSync Off – Feedback only
<b>320</b>	ON: Sync On Green On – Feedback only OFF: Sync On Green Off – Feedback only

**Table 2 – Virtual Device Channel Events**

## **Levels**

The UI module controls the WolfVision Visualizers via level events (NetLinx command *send\_level*) sent to the COMM module. The levels supported by the COMM module are listed below. These levels are associated with the virtual devices and are independent of the levels associated with the touch panel device.

<b>Level</b>	<b>Description</b>
<b>15</b>	Zoom level – 0..255
<b>16</b>	Focus level – 0..255
<b>17</b>	Iris level – 0..255
<b>50</b>	Digital Zoom level – 0..255
<b>51</b>	Mirror level – 0..255

**Table 3 – Virtual Device Level Events**



## **Command Control**

The UI module controls the WolfVision Visualizer via command events (NetLinx command *send\_command*) sent to the COMM module. The commands supported by the COMM module are listed below.

**PLEASE NOTE:** An '\*' indicates an extension to the standard API

Command	Description
*ARM-<position>	Controls the arm position of the Visualizer. <b>Note:</b> This command is only supported on Professional Series Visualizers.  <position> : DOWN UP TOGGLE  AMR-DOWN
*?ARM	Retrieves the actual arm position. <b>Note:</b> The feedback of this command is specified in the <a href="#">Command Feedback</a> section below.  ?ARM
*AF-ONEPUSH	Executes a single Auto Focus operation. <b>Note:</b> This command is not supported on Portable Series Visualizers (they already have an Auto Focus).  AF-ONEPUSH
DEBUG-<value>	Set the state of debugging messages in the UI module and the COMM module. <b>Note:</b> By default, this is set to 1 at startup.  <value> : 1 = set only error messages on 2 = set error and warning messages on 3 = set error, warning and information messages on 4 = set all messages on (incl. debug messages)  DEBUG-1
?DEBUG	Retrieves the actual debug state from the UI module and COMM module.  ?DEBUG
FOCUS-<direction>	Adjusts the focus position a predefined amount of steps towards the near or far position. <b>Note:</b> The amount of steps is defined by the specific device and can't be changed by the user.  <direction> : NEAR FAR  FOCUS-FAR
*IMAGETURN-CYCLE	Cycles through the image turn states predefined by the selected image turn mode in the on-screen menu of the Visualizer. It's possible to select one of the following modes: - 0/90 (OFF, 90 deg. ON) - 0/180 (OFF, 180 deg. ON) - 0/-90 (OFF, -90 deg. ON) - 0/90/180/-90 (OFF, 90 deg. ON, 180 deg. ON, -90 deg. ON)  IMAGETURN-CYCLE

*IR_CODE-CYCLE	<p>Cycles the IR coding scheme between codes A, B, C, and D.</p> <p><b>Note:</b> The IR remote control has to be configured for the same IR coding scheme to ensure that it works together with the Visualizer.</p> <p>IR_CODE-CYCLE</p>
IRIS-<direction>	<p>Adjusts the iris position a predefined amount of steps towards the open or close position.</p> <p><b>Note:</b> The amount of steps is defined by the specific device and can't be changed by the user.</p> <p>&lt;direction&gt; : OPEN CLOSE</p> <p>IRIS-CLOSE</p>
*LIGHT-<cmd>	<p>Retrieves information about the light- and slidebox status of the Visualizer.</p> <p><b>Note:</b> The feedbacks of all these commands are specified in the <a href="#">Command Feedback</a> section below.</p> <p>&lt;cmd&gt; : SB_GET = State of the slidebox (ON or OFF)? LB_GET = State of the lightbox (ON or OFF)? LB_DETECT = Is there a lightbox connected (TRUE or FALSE)?</p> <p>LIGHT-LB_DETECT</p>
*MACRO-<cmd>	<p>Change the actual zoom macro state of the Visualizer.</p> <p><b>Note:</b> This command is only supported on Professional Series Visualizers.</p> <p><b>Note:</b> The zoom macro state which is used for toggling (11X or 12X) is defined in the on-screen menu of the device.</p> <p>&lt;cmd&gt; : 11X = Switch to 11X zoom macro 12X = Switch to 12X zoom macro OFF = Switch off zoom macro TOGGLE = Toggles the zoom macro state (ON or OFF)</p> <p>MACRO-OFF</p>
*?MACRO	<p>Retrieves the actual zoom macro state of the Visualizer.</p> <p><b>Note:</b> The feedback of this command is specified in the <a href="#">Command Feedback</a> section below.</p> <p>?MACRO</p>
*MEMORY-<cmd>	<p>Handles the built-in image memories of the Visualizer. Storing an image in a memory is done with an additional command (see MEMORY_STORE-&lt;#&gt;).</p> <p><b>Note:</b> This command is not supported on every Visualizer. For example the VZ-8light doesn't have any image memories.</p> <p>&lt;cmd&gt; : OFF = Switch to the live camera image SNAPSHOT = Stores one memory after the other memory, until all 9 memories are stored ERASE = Erase all memories 1..9 = Recall memory 1 to 9</p> <p>MEMORY-9 MEMORY-SNAPSHOT</p>
*MEMORY_STORE-<#>	<p>Stores the actual live camera image in an image memory identified by &lt;#&gt;.</p> <p><b>Note:</b> This command is not supported on every Visualizer. For example the VZ-8light doesn't have any image memories.</p> <p>&lt;#&gt; : 1..9 = Store memory 1 to 9</p> <p>MEMORY_STORE-9</p>

*MENU-<cmd>	<p>Controls the on-screen menu of the Visualizer. It's possible to reset single items or even the whole menu and toggle between menu On or Off.</p> <p>&lt;cmd&gt; : RESET = Reset all settings to default values  RESET_ITEM = Reset a single menu item to a default value  TOGGLE = Toggle the menu state between on and off</p> <p>MENU-RESET  MENU-TOGGLE</p>
*MIRROR-<direction>	<p>Adjusts the mirror position a predefined amount of steps towards the up or down position.  <b>Note:</b> The amount of steps is defined by the specific device and can't be changed by the user.</p> <p>&lt;direction&gt; : UP  DOWN</p> <p>MIRROR-DOWN</p>
*NEGATIVE-<state>	<p>Controls the positive/negative setting of the Visualizer.</p> <p>&lt;state&gt; : OFF  ON  BLUE = Negative Blue for better contrast of x-rays</p> <p>NEGATIVE-ON</p>
*?NEGATIVE	<p>Retrieve the actual positive/negative setting of the Visualizer.  <b>Note:</b> The feedback of this command is specified in the <a href="#">Command Feedback</a> section below.</p> <p>?NEGATIVE</p>
PASSTHRU-<string>	<p>Allows user the capability of sending commands directly to whatever unit is attached without processing by the Duet module. User must be aware of the protocol implemented by the unit to use this command. This gives the user access to features that may not be directly supported by the module. For more information, see the <a href="#">Adding Functions to Modules</a> section below.  <b>Note:</b> The module adds the delimiter (ETX), "0x0D" (CR), for you.</p> <p>&lt;string&gt; : string to send to unit</p> <p>PASSTHRU-244  PASSTHRU-049,163,4095</p>

*PRESET-<cmd>	<p>Recalls predefined image setting configurations. Following Visualizer settings are recalled: Zoom-Position, Focus-Position, Auto Iris On/Off, Iris-Position (if AI Off), Light On/Off, Light box On/Off, and Text Enhancer On/Off.</p> <p>&lt;cmd&gt; : 0 = Preset 0, Factory Preset  1 = Preset 1  2 = Preset 2  3 = Preset 3  MAX_WIDE = Maximum Wide position for zoom, upper light on  A4 = Approx. A4 size, upper light on  A5 = Approx. A5 size, upper light on  A6 = Approx. A6 size, upper light on  A7 = Approx. A7 size, upper light on  A8 = Approx. A8 size, upper light on  MAX_TELE = Maximum Tele position for zoom, upper light on  SLIDE = Approx. slidebox size, upper light on  XRAY_A4 = For x-ray images with format A4  XRAY_A5 = For x-ray images with format A5</p> <p>PRESET-XRAY_A4  PRESET-A6</p>
*PRESET_STORE-<#>	<p>Stores the actual settings in a preset memory identified by &lt;#&gt;. Following Visualizer settings are stored: Zoom-Position, Focus-Position, Auto Iris On/Off, Iris-Position (if AI Off), Light On/Off, Light box On/Off, and Text Enhancer On/Off.</p> <p>&lt;#&gt; : 1..3 = Store preset 1 to 3</p> <p>PRESET_STORE-2</p>
REINIT	<p>Re-initializes the communication link and data.  <b>Note:</b> This command deletes any messages waiting to go out to the Visualizer.</p> <p>REINIT</p>
*RES_BOTH-<mode>	<p>Change the actual resolution on both outputs (RGB and DVI).</p> <p>&lt;mode&gt; : UP  DOWN  AUTO = Resolution is automatically detected</p> <p>RES_BOTH-UP</p>
*RES_DVI-<mode>	<p>Change the actual resolution on the DVI output.</p> <p>&lt;mode&gt; : UP  DOWN  AUTO = Resolution is automatically detected</p> <p>RES_DVI-UP</p>
*?RES_DVI	<p>Retrieves the actual resolution on the DVI output.  <b>Note:</b> The feedback of this command is specified in the <a href="#">Command Feedback</a> section below.</p> <p>?RES_DVI</p>
*RES_RGB-<mode>	<p>Change the actual resolution on the RGB output.</p> <p>&lt;mode&gt; : UP  DOWN  AUTO = Resolution is automatically detected</p> <p>RES_RGB-UP</p>

*?RES_RGB	<p>Retrieves the actual resolution on the RGB output.</p> <p><b>Note:</b> The feedback of this command is specified in the <a href="#">Command Feedback</a> section below.</p> <p>?RES_RGB</p>
?VERSION	<p>Retrieve the actual Duet module version.</p> <p><b>Note:</b> The feedback of this command is specified in the <a href="#">Command Feedback</a> section below.</p> <p>?VERSION</p>
*VIDEO-<mode>	<p>Changes the video mode of the Visualizer to &lt;mode&gt;.</p> <p>&lt;mode&gt; : PAL NTSC</p> <p>VIDEO-PAL</p>
*?VIDEO	<p>Retrieves the actual video mode of the Visualizer.</p> <p><b>Note:</b> The feedback of this command is specified in the <a href="#">Command Feedback</a> section below.</p> <p>?VIDEO</p>
*?VZTYPE	<p>Retrieves the device type (e.g. VZ-9 or VZ-57P) of the Visualizer.</p> <p><b>Note:</b> The feedback of this command is specified in the <a href="#">Command Feedback</a> section below.</p> <p>?VZTYPE</p>
*?VZVERSION	<p>Retrieves the firmware version of the Visualizer.</p> <p><b>Note:</b> The feedback of this command is specified in the <a href="#">Command Feedback</a> section below.</p> <p>?VZVERSION</p>
ZOOM-<direction>	<p>Adjusts the zoom position a predefined amount of steps towards the tele or wide position.</p> <p><b>Note:</b> The amount of steps is defined by the specific device and can't be changed by the user.</p> <p>&lt;direction&gt; : TELE WIDE</p> <p>ZOOM-WIDE</p>

**Table 4 – Send Command Definitions**

## **Command Feedback**

The COMM module provides feedback to the User Interface module for Visualizer changes via command events. The commands supported are listed below.

**PLEASE NOTE:** Feedback is only provided when there is a state change. If no state change resulted from the command sent, then no feedback will be returned.

Command	Description
ARM-<position>	Feedback for the arm position.  <position> : DOWN UP  AMR-DOWN
DEBUG-<value>	Feedback on setting the level of debugging messages in the COMM module. The UI module will use the same level for its own messages. <b>Note:</b> By default, this is set to 1 at startup.  <value> : 1 = set only error messages on 2 = set error and warning messages on 3 = set error, warning and information messages on 4 = set all messages on (incl. debug messages)  DEBUG-1
LIGHT-<state>	Feedback for the slidebox state and the lightbox connection state.  <state> : SB_ON SB_OFF LB_CONNECTED LB_DISCONNECTED  LIGHT-LB_CONNECTED
MACRO-<mode>	Feedback for the actual zoom macro state. <b>Note:</b> This command feedback is only supported on Professional Series Visualizers.  <mode> : 11X 12X OFF  MACRO-OFF
NEGATIVE-<state>	Feedback for the positive/negative setting.  <state> : OFF ON BLUE = Negative Blue for better contrast of x-rays  NEGATIVE-ON

RES_DVI-<res>	<p>Feedback for the resolution on the DVI output.</p> <pre> &lt;res&gt; : AUTO VGA/60    = 640x480, 60 Hz SVGA/60   = 800x600, 60 Hz SVGA/75   = 800x600, 75 Hz SVGA/85   = 800x600, 85 Hz XGA/60    = 1024x768, 60 Hz XGA/75    = 1024x768, 75 Hz XGA/85    = 1024x768, 85 Hz SXGA-/60  = 1280x960, 60 Hz SXGA-/85  = 1280x960, 85 Hz SXGA/60   = 1280x1024, 60 Hz SXGA/75   = 1280x1024, 75 Hz SXGA/85   = 1280x1024, 85 Hz SXGA+/60  = 1360x1024, 60 Hz SXGA+/75  = 1360x1024, 75 Hz UXGA/60   = 1600x1200, 60 Hz XGA 16:9  = 1024x768, 60 Hz, image is 16:9 but               stretched to 4:3 WXGA/60   = 1366x768, 60 Hz WSXGA/60  = 1680x1050, 60 Hz 720p/50   = 1280x720, 50 Hz 720p/60   = 1280x720, 60 Hz 1080p/50  = 1920x1080, 50 Hz 1080p/60  = 1920x1080, 60 Hz </pre> <p>RES_DVI-XGA 16:9</p>
RES_RGB-<res>	<p>Feedback for the resolution on the RGB output.</p> <pre> &lt;res&gt; : AUTO VGA/60    = 640x480, 60 Hz SVGA/60   = 800x600, 60 Hz SVGA/75   = 800x600, 75 Hz SVGA/85   = 800x600, 85 Hz XGA/60    = 1024x768, 60 Hz XGA/75    = 1024x768, 75 Hz XGA/85    = 1024x768, 85 Hz SXGA-/60  = 1280x960, 60 Hz SXGA-/85  = 1280x960, 85 Hz SXGA/60   = 1280x1024, 60 Hz SXGA/75   = 1280x1024, 75 Hz SXGA/85   = 1280x1024, 85 Hz SXGA+/60  = 1360x1024, 60 Hz SXGA+/75  = 1360x1024, 75 Hz UXGA/60   = 1600x1200, 60 Hz XGA 16:9  = 1024x768, 60 Hz, image is 16:9 but               stretched to 4:3 WXGA/60   = 1366x768, 60 Hz WSXGA/60  = 1680x1050, 60 Hz 720p/50   = 1280x720, 50 Hz 720p/60   = 1280x720, 60 Hz 1080p/50  = 1920x1080, 50 Hz 1080p/60  = 1920x1080, 60 Hz </pre> <p>RES_RGB-XGA 16:9</p>

VERSION-<value>	<p>Reports the current version number of the Duet module.</p> <p>&lt;value&gt; : Current version number in xx.yy format</p> <p>VERSION-1.00</p>
VIDEO-<string>	<p>Feedback for the video mode setting.</p> <p>&lt;string&gt; : PAL NTSC</p> <p>VIDEO-PAL</p>
VZTYPE-<string>	<p>Feedback for the Visualizer type information.</p> <p>&lt;string&gt; : Visualizer type, e.g. VZ9, VZ57P, or VZ-C32</p> <p>VZTYPE-VZ57P</p>
VZVERSION-<string>	<p>Feedback for the Visualizer firmware version.</p> <p>&lt;string&gt;: Visualizer firmware version, e.g. 1.41c, 1.22a, or 1.11f</p> <p>VZVERSION-1.22a</p>

**Table 5 – Command Feedback Definitions**

### **Device notes**

- This module is only capable of handling WolfVision Visualizers over a RS232 connection. Although some Visualizer models are equipped with an Ethernet interface they can not be controlled over TCP/IP with this module.
- If the device doesn't respond to any command check if the baud rate is set to 9600. This can be done by pressing the menu button on the remote control until the extra menu of the Visualizer is displayed.
- Not all commands provided by the COMM module are also supported by a specific Visualizer. For example, portable series Visualizers don't support the zoom macro commands. If such an unsupported command is sent to the device it will respond with an error message and will continue waiting for commands. If the user sends an invalid command with the PASSTHRU command the Visualizer will behave the same way as if the command wasn't supported. For a list of valid commands for a specific device, see the serial protocol of the device available at the WolfVision homepage.
- Not all output resolutions are supported by a specific Visualizer. For example, a VZ-8 doesn't have any wide screen resolution (e.g. 1080p).
- It's also not possible to select an output resolution for a specific device output (RGB or DVI) with this COMM module because the device doesn't provide the necessary serial commands for such a feature.
- Professional devices only: If you want to use the mirror level for mirror position changes ensure that the according Visualizer runs on firmware version 2.00a or greater, otherwise the mirror level functions won't work (especially the RS232 command MIRROR\_SET).
- Professional, ceiling and VZ-9 devices only: If you want to use the image mute channel ensure that the according Visualizer runs on firmware version 2.00a or greater, otherwise the image mute channel won't work correctly.
- VZ-8, VZ-8light, VZ-8plus, VZ-8light<sup>2</sup> and VZ-8plus<sup>2</sup> only: The image mute channel is not supported on these devices.



## **Programming notes**

- When the master boots up the communication module makes a series of inquiries to the WolfVision device to determine the current device state. The necessary reply mode of the device is set and the Visualizer type and firmware version information are retrieved.
- After the master has detected the Visualizer and the first queries were executed (Reply mode, type and firmware version information) the COMM module starts a timeline to ensure that the COMM module is always up to date.
- At startup and when the 'REINIT' command is used, all values are set to default values. If these values are not initialized during the startup or re-initialization sequence, then they remain set to their default values and may be returned if a query/get command is sent. The default value for all integers is 0, boolean values default to 0/false, arm value is set to 'DOWN', positive/negative value is set to 'POSITIVE', macro value is set to 'OFF' and video, resolution on RGB and resolution on DVI are set to 'UNDEFINED'.
- This module implements a heartbeat to tell if the device is still connected. The heartbeat is performed by issuing some status queries (every 3 seconds, also used for updating the current device state). If there is no response received for three commands successively sent to the device, the module will assume the device has gone offline, if a response is received, the module assumes the device is present.
- The protocol manual says that the device will not process any new commands until it has sent a response to the previous command, so I have set it to dequeue commands on response.

## **Adding Functions to Modules**

### **Commands to the device**

This module provides a mechanism to allow additional device features to be added to software using the module. This is the PASSTHRU command, which allows protocol strings to be passed through the module. The device-specific protocol must be known in order to use this feature. There are four different kinds of strings which can be sent to the Visualizer with the PASSTHRU command:

Syntax	Length	Example
PASSTHRU-<cmd>	3 bytes	PASSTHRU-244 (Toggle demo mode)
PASSTHRU-<cmd>,<param>	8 bytes	PASSTHRU-126,0500 (Set zoom position to 500)
PASSTHRU-<codepage>,<cmd>	5 bytes	PASSTHRU-1,164) (Get digital zoom position)
PASSTHRU-<codepage>,<cmd>,<param>	10 bytes	PASSTHRU-1,163,0059 (Set digital zoom pos. to 59)

**Table 6 – Usage of Command PASSTHRU**

<cmd>            value between 0 and 255, always has to be 3 digits long (000 - 255)  
<param>        value between 0 and 4095, always has to be 4 digits long (0000 - 4095)  
<codepage>     value has to be 1, always has to be 1 digit long (0 - 1)

As an example, this module has not implemented the demo mode feature. The command that the Visualizer protocol requires is 244 (no codepage selection or parameter is needed). In this case, the following string should be sent from the UI code to switch the Visualizer demo mode on.

```
send_command vdvDocCam, "PASSTHRU-244"
```

For example if you would like to set the digital zoom position to 95 (codepage 1 is needed, parameter is 0095) the following string can be sent to the Visualizer instead of using the digital zoom level.

```
send_command vdvDocCam, "PASSTHRU-1,163,0095"
```

The reason to use PASSTHRU instead of sending a protocol string directly to the device port is that the device may require command queuing, calculation of checksums, or other internal processing, which would not be done if the string was sent directly. Because of this, it is best to filter all communication TO the device through the module. (The module documentation will indicate any processing that will be automatically done to the PASSTHRU string like checksum calculation.)

## **Responses from the device**

The module will automatically interpret replies from the device and pass these on to the application code according to the documented API. Some device replies may not be passed on to the application code. To see all replies from the device, unfiltered by the module, use the PASSBACK option. Again, the device-specific protocol must be known in order to interpret these responses. Even when PASSBACK is enabled, the module will still interpret device responses according to the standard API as well.