USER GUIDE
VINDEN 75T CORE

10-80158, REV A

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1 SAFETY CONDITIONS

Read all instructions prior to use.

Observe ESD (electrostatic discharge) precautions when handling.

The camera requires reasonable thermal sinking when operating. Use stirred air and conduction to the outside environment when the camera is installed in an enclosure.

The camera must be operated within its environmental limits (-40C to +70C)

Repairs and service are to be completed only by Sierra Olympia Technologies. Please refer any Vinden 75T issues to support@sierraolympia.com

At the end of its service life, please dispose of the product in accordance with local disposal regulations for electronic devices. Alternatively, you may return the camera to Sierra Olympia Technologies, Inc.

2 EXPORT NOTICE

This document may contain technology and/or technical data whose export, transfer, and/or disclosure may be controlled by the US Export Administration Regulations (EAR). Diversion contrary to US law is prohibited.

3 REFERENCE DOCUMENTS

The table below is split into 3 sections. The first includes documents relevant to any configuration of the Vinden 75T Core. The next sections list the electrical ICDs and user guides relevant to those backends.

These documents are included on the delivery disk shipped with the camera, and in some cases are downloadable from the support section of our website. You may also reach out to your sales representative or the SOTI support team to get any of these documents.

Number	Description	Title
Vinden 75T Documents (All backends)		
DRS 1031753	Tenum 640 Software ICD	Tenum 640 Software Interface Control Document
DRS 1040066	Tenum 640 Electrical ICD	Tenum 640 Electrical Interface Document
DRS 1042021	Tenum 640 User Guide	Tenum 640 User Guide
DRS 1042028	User Guide, CCS	Tenum 640 Camera Control Software User Guide
N/A	Ophir User Manual	Ophir Gen3-UserManual
S-D11400	User Guide, USBreeze Viewer	User Guide, USBreeze Viewer
S-D11517	User Guide, Viento GUI	User Guide, Viento GUI
20-70042	Mechanical ICD, Vinden 75T Core	Mechanical ICD, Vinden 75T Core
USB Specific Documents		
S-D11285	USB Electrical ICD	Electrical ICD, DRS USB
S-D11515	Quick Start Guide, USB	Quick Start Guide, Viento Family USB
GigE Specific Documents		
20-70068	Electrical ICD, GigE	Electrical ICD, Viento GigE Family
S-D11516	Quick Start Guide, GigE	Quick Start Guide, Viento Family GigE
SDI Specific Documents		
20-70054	Electrical ICD, SDI	Electrical ICD, Viento Family SDI
MIPI Specific Documents		
20-70060	Electrical ICD, MIPI	Electrical ICD, Viento Family MIPI
10-80152	User Guide, MIPI	User Guide, Viento MIPI
10-80023	Firmware API, MIPI	Viento Family MIPI Firmware API

4 INTRODUCTION

The Vinden 75T Core is an OEM packaging of a longwave infrared (LWIR) continuous zoom (CZ) camera. While Sierra Olympia products have a unified software/electrical interface, the Vinden 75T has a separate interface for both the sensor and lens with various sensor-specific interface accessories available (USB, GigE, SDI, MIPI, DRS Feature Board).

This document will detail how to communicate with both the sensor and lens interface including information on where to find their supporting software and documentation.

SOTI calibrates the Vinden 75T core's infinity focus position across its 5x zoom range (15-75mm effective focal length). The horizontal field-of-view (HFOV) ranges from 4.9° at NFOV to 24.8° at WFOV.

The sensor has two distinct 2-point Custom Lens Calibration (CLC) tables which correct lens-nonuniformities across the zoom range. More information on the CLCs is in section 9.

5 INCLUDED ITEMS

Packaging contains the following items:

- Vinden 75T camera
  - Assembled Sensor + Lens
- Applicable reference documents
- Software
  - DRS CCS (Camera Control Software)
  - OphirSim software

6 RECCOMENDED EQUIPMENT

- USB-UVC backend to communicate with the sensor and transmit video
  - Alternate backends are available, this guide focuses on the USB-UVC offering
  - SOTI developed USBreeze application can be used with the USB backend for convenient video streaming
  - The 75T core with the recommended USB-UVC backend can be purchased under SOTI PN: SL-VLT-A-30-00
- Lens power and communication
  - 60-40028 Lens Interface Harness can be purchased for initial development
  - If you use our 60-40028 cable, you need a power supply with banana jacks, capable of 12v output

7 LENS CONTROL

This section describes how to power and communicate with the lens, especially for initial benchtop demonstration, using the recommended equipment from section 6.

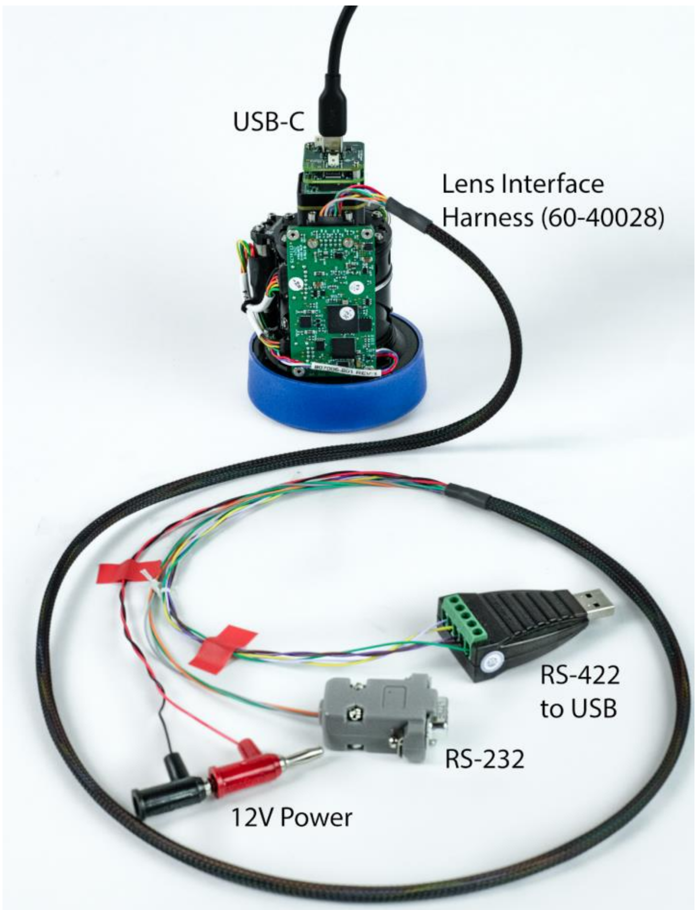

Figure 1: Lens Interface Harness (60-40028) and USB-C Cable

Use the Lens interface harness (60-40028) to power the lens via banana plugs and to communicate over RS-422 serial (via USB adapter). Apply 12V power to the banana plugs and check that the serial USB adapter has assigned a COM port on the computer. If you prefer, you can also communicate with the lens via the RS232 serial connector.

Next, install the OphirSim software (if not already installed). Please refer to the README file (in "Ophir_15-75mm_Lens"' folder on delivery disk) for more details on the installation. Install the NLPI file for the 15-75mm lens (in same folder). The lens can now be controlled with OphirSim.

To control the lens, launch OphirSim, and then open the **Communication** > **COM Properties** menu item (figure 2). This will open the UART properties dialog box (figure 3),

Next, set the **COM Port** dropdown to the assigned serial COM port, and the baud rate to 57600 and click **OK**.

Then click **Connect** in the main OphirSim window (figure 4). The **W**, **M**, and **N** buttons can be used to set the field of view to wide, mid or narrow field of view. The **Zoom In** and **Zoom Out** buttons allow for fine control of the field of view. The **Infinity** button will set focus to the calibrated, infinity focus position for the current zoom position. The **Far** and **Near** arrow buttons, or the slider below can be used to further adjust focus.

For additional information, please refer to the Ophir Gen3-UserManual.

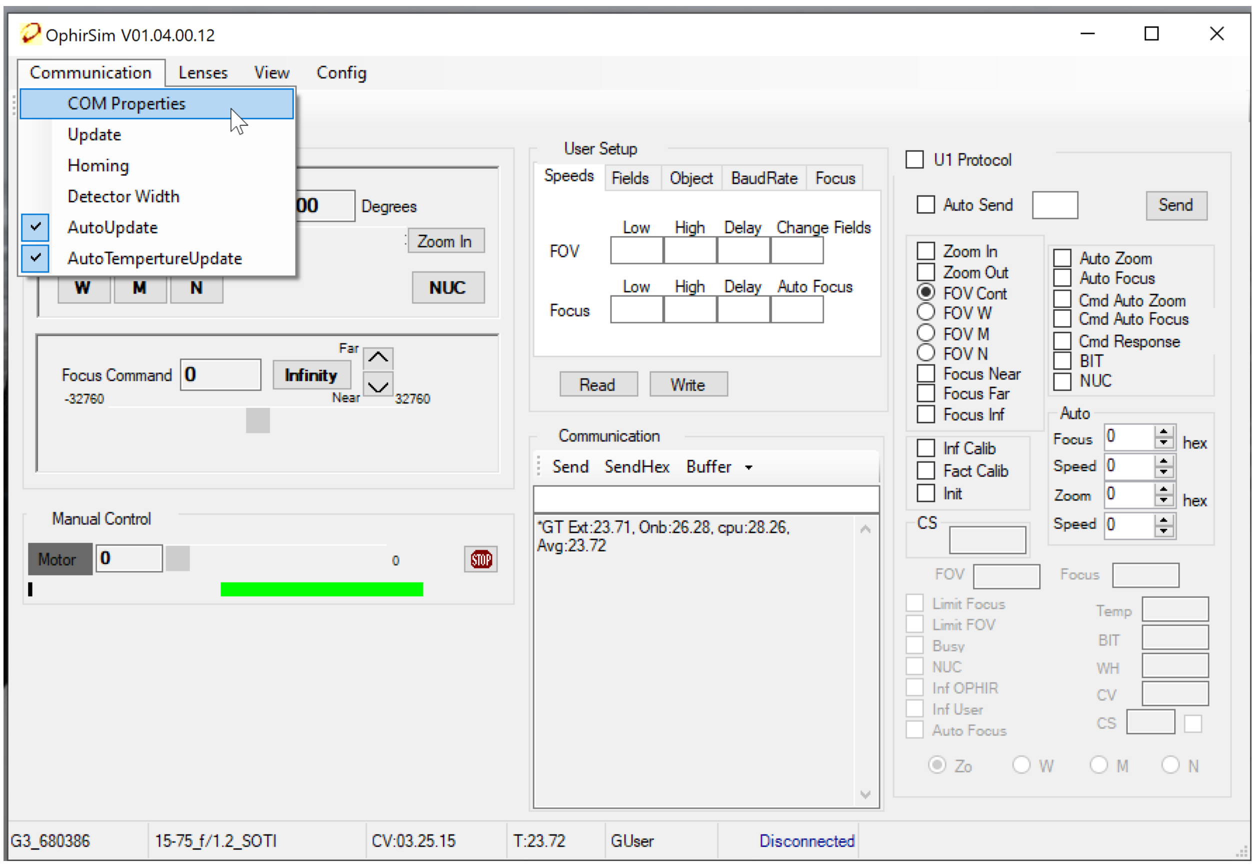

Figure 2: Ophir Sim COM Properties

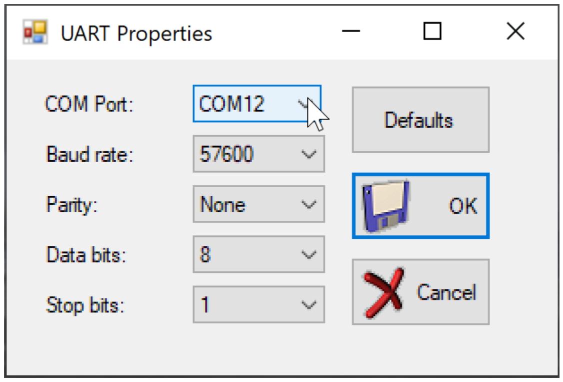

Figure 3: Ophir Sim UART Properties

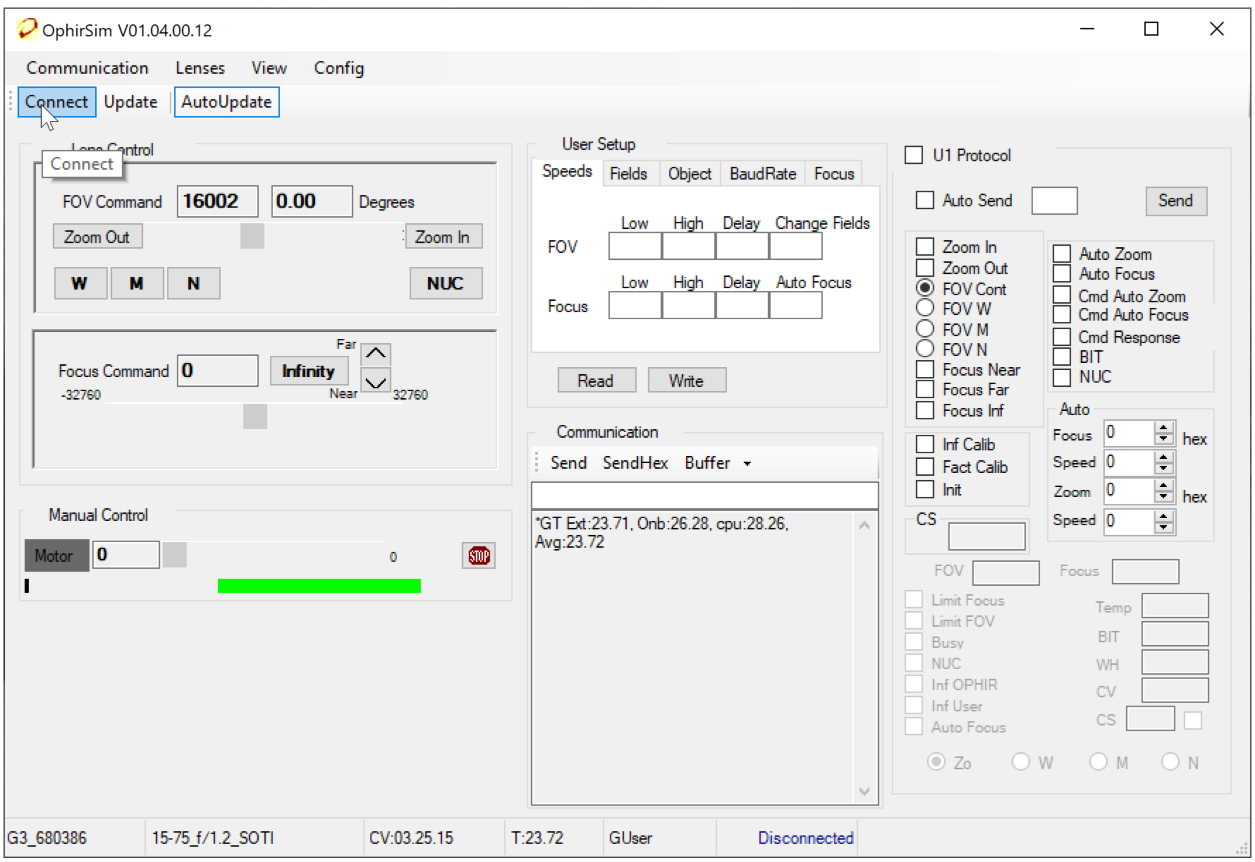

Figure 4: Ophir Sim Main Window

8 SENSOR CONTROL (USING USB-UVC BOARD)

This section details how to connect and communicate with the DRS Tenum 640 sensor using the provided USB-C cable and USB-UVC backend option with the DRS Camera Control Software (CCS). If you use a different backend (such as, but not limited to, SDI), please refer to the reference documents listed in section 3.

DRS Camera Control Software is intended for benchtop demonstration. Users may also develop their own application-specific control software using the Tenum 640 protocol description.

When CCS starts, it will automatically attempt to establish connection with a DRS camera over serial. If automatic connection fails, CCS will prompt the user to manually add the camera. To manually add the camera, first, select **Manually add device**, and look for a dialog box called "add devices" (figure 5). Select **Custom** on the COM dropdown and enter the sensor's COM port. If you need help determining the correct COM port, monitor the windows device manager after plugging in the camera. Then click **Add Device**.

Note that the baud rate of 57600 is arbitrary (for serial over USB). Also note that even though the connection is via USB-C, the communication type should be set to RS232.

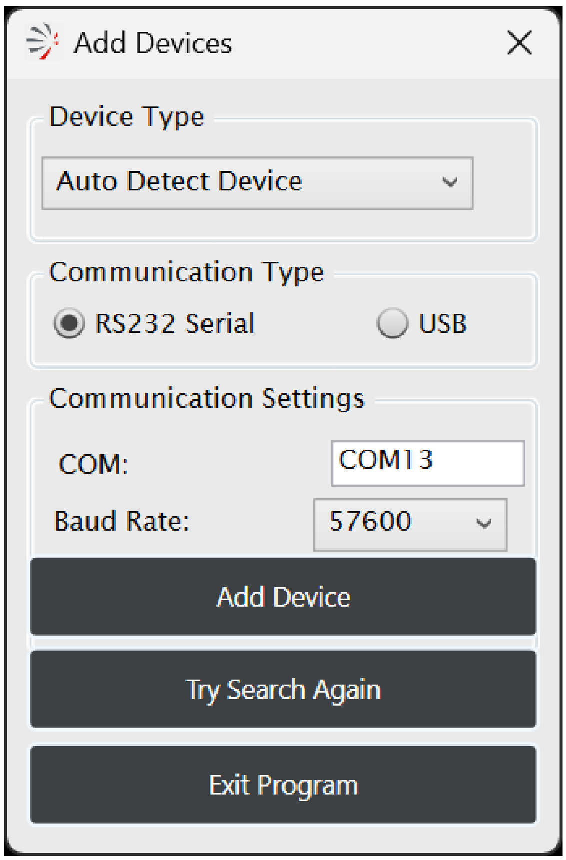

Figure 5: CCS Manually Add Device

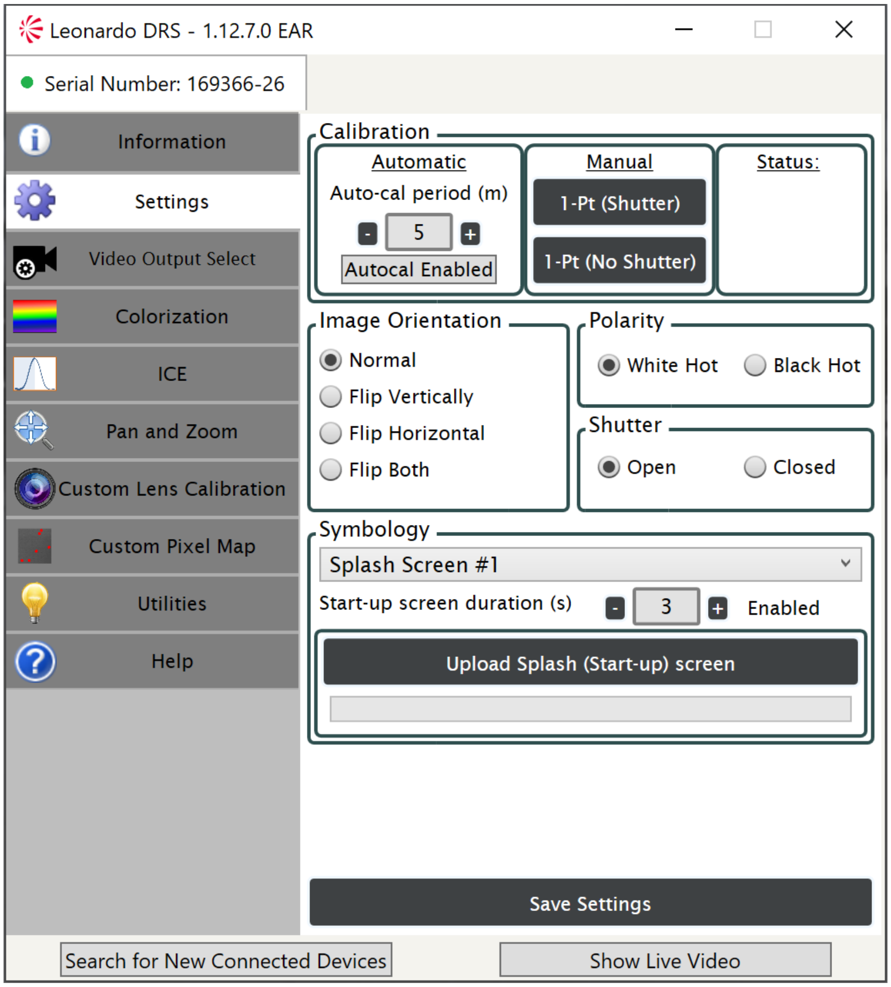

Figure 6: CCS Settings

Full bit-depth video may be monitored using Sierra Olympia's USBreeze Viewer. The USBreeze software will rescale to 8-bit display with client-side control of brightness and contrast. Please refer to the USBreeze user guide for additional details. Video may also be monitored in 8-bit mode using CCS or other third-party software (such as VLC player). If monitoring 8-bit video, CCS can be used to control image contrast enhancement and scaling parameters via the ICE tab.

9 CUSTOM LENS CALIBRATION (CLC)

The Tenum 75T is factory calibrated with two CLC tables. These CLCs are 2-point linear non-uniformity corrections (NUCs) performed at 12C and 32C blackbody (scene) temperatures. The CLCs purpose is to correct spatial non-uniformity (i.e. lens shading) from the lens.

These tables can be accessed and switched using CCS. CLCs can also be switched via non-volatile parameters. Please refer to the Tenum 640 Software ICD for more information on NVP IDs 63 and 64.

CLC table 2 works best at WFOV while CLC table 1 works best at all other FOVs. The quality (residual spatial uniformity) of the factory loaded CLCs will slowly degrade as the scene temperature deviates from the calibration range of 12-32C.

The user can add additional tables (up to 5 in total) by following the prompts CCS's Custom Lens Calibration Tab.

10 WINDOW PLACEMENT

Some customers may opt to add a protective window in front of their Vinden 75T core. The Vinden 75T's Mechanical ICD provides the necessary information to place a window without inducing vignetting.

If the window is not placed at an angle, then a portion of the FPA's emitted heat may reflect onto itself (narcissus effect). To prevent narcissus, we recommend tilting the window vertically by at least 10°. If this is not possible, then performing a CLC with the window in place can improve spatial non-uniformity due to this narcissus effect.

The minimum recommended window clear aperture (for an untitled, circular window) can be calculated using the following equations, where 'd' is the distance from the vertex of the lens' front element to the window. If the window is tilted, it must be proportionally larger based on the tilt angle.

$$Window\ Diameter_{NFOV} = 66.88mm + 2d * \tan(DFOV_{NFOV})$$

$$Window\ Diameter_{WFOV} = 13.90mm + 2d * \tan(DFOV_{WFOV})$$

$$Min\ Window\ Diameter = \max\left(Window\ Diameter_{NFOV}, Window\ Diameter_{NFOV}\right)$$

Where 66.88mm and 13.90mm are the diameters of the Entrance pupils at NFOV and WFOV respectively. The Entrance pupil represents the location where all the ray bundles overlap and are completely out of focus. The NFOV and WFOV entrance pupils are located 99.02mm and 26.78mm from the front element's vertex respectively (towards the sensor). These figures can also be found on the mechanical ICD.

Note that the front element clips a small portion of the corner ray bundle, which is compensated via our factory CLC. This choice was made by the lens designer to optimize size, cost and performance.

11 ADDITIONAL BACKENDS

In addition to USB-C, the Vinden 75T may be ordered and used with a GigE, MIPI, SDI backend or DRS feature board (or bare). For information on the general dimensions and electrical interfaces please refer to the backend-specific ICDs under the reference documents section.

12 REVISION HISTORY

Revision	Date	Description	ECO
Rev A	2025-05-15	Initial Release	1821