SIERRA-OLYMPIA TECHNOLOGIES INC.

QUICK START GUIDE
VENTUS COMPACT
AND COMPACT MK2

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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 outside environment when installed in an enclosure.

The camera must be operated within the environmental limits.

Repairs and service are to be completed only by Sierra Olympia Technologies. Please refer any issues to your sales representative.

2 EXPORT NOTICE

Product Export Classification Control Number (ECCN) 6A003.b.4.a. This document does not contain export-controlled technology.

3 REFERENCE DOCUMENTS

Document Number	Document Title
S-D11700	Mechanical ICD, Ventus Compact
S-D11701	Mechanical ICD, Ventus Compact No Lens
20-70038	Mechanical ICD, Ventus Compact mk2
20-70044	Mechanical ICD, Ventus Compact mk2 CCW Lens Clock
S-D11713	Electrical ICD, Ventus Compact
S-D07-10496	WIND Viewer User Guide
S-D03-10409	WIND Firmware API
20-70039	Mechanical ICD, Ventus Compact mk2 Core
65196	ZoomLens19-275mmUserManual
102-2020-40	Neutrino LC Engineering Datasheet
50-90004	Technical Note 19-275mm MWIR Zoom Lens Focus Characteristics

4 INCLUDED ITEMS VENTUS COMPACT AND MK2 CAMERA

Description	Part Number
Ventus Compact camera	SL-VMN-275-10, SL-VMN-275-12, SL-VMN-275-13, SL-VMN-N00
Micro-HDMI to HDMI adapter	S-C11372
USB Delivery Drive • WIND Viewer • WIND Viewer User Guide • WIND Firmware API • Ventus Compact Mechanical ICD • Ventus Compact Electrical ICD • Ventus Compact Quick Start Guide (this document)	 NA S-D07-10496 S-D03-10409 S-D11700 or S-D11701 or 20-70038 or 20-70044 S-D11713 S-D11712

Description	Part Number
• SLA PanelPlus Utility • Certificate of Conformance	NA NA

4.1 Recommended Equipment for Ventus Compact and Mk2 Cameras

Cable Name	SOTI PN	Manufacturer PN
Input Power Cable	S-A07-10237 or S-A07-10497	NA
Serial camera control	S-A07-10236	NA
Ethernet	S-A07-10240	NA
HDMI	S-C11372	Tripp-Lite P142-06N-Micro
Camera Link Adapter Kit	S-A07-10251	NA

5 INCLUDED ITEMS VENTUS COMPACT MK2 CORE

Description	Part Number
Ventus Compact camera core	SL-VMN-275-02
USB Delivery Drive • Ventus Compact Mechanical ICD • Ventus Compact Quick Start Guide (this document) • SLA PanelPlus Utility • Certificate of Conformance • 65196-ZoomLens19-275mmUserManual • 102-2020-40 Neutrino LC Engineering Datasheet	 20-70039 S-D11712 NA NA NA NA

6 INTRODUCTION

The Ventus Compact is a continuous zoom, autofocus-capable, cooled MWIR imager designed for integrators and OEMs. This quick start guide will cover basic operation of the product. More detailed technical information may be found in the ICDs (interface control documents) referenced in section 3.

This document applies to the Ventus Compact, the updated Ventus Compact Mk2, and corresponding 'Core' versions of the cameras. The Ventus Compact Mk2 has the same optical format, interface, and similar size as its predecessor, with improved optical performance at a slightly higher mass. The 'Core' versions of the cameras do not include a Sightline video processor and are intended for customers who want to build their own interface and control schemes for the sensor and lens calibration.

The camera includes a processing engine referred to as the SightLine processor, or SLA. The SLA performs video rendering/processing, IP encoding, and control of camera subsystems (lens and sensor). Control commands are sent to the SLA via Ethernet or serial connection and may be passed through to subsystems as described in the WIND Firmware API, also referenced in section 3.

A sample user interface (WIND Viewer) is included on the delivery disk to demonstrate functionality of video encoding and protocol command structure. This quick start guide will describe camera operation the operation of WIND Viewer.

The Ventus Compact is ready to operate out of the box. This guide will explain the steps to begin imaging.

This document applies to WIND Viewer Version 3.1. More detailed information on WIND Viewer is available in the WIND Viewer User Guide.

7 SETUP PROCEDURE

Pinouts for the connectors mentioned in this section can be found in document S-D11713, Electrical ICD, Ventus Compact which is included on the delivery disk.

7.1 Connect the Picoblade-terminated Ethernet cable to J11 as shown in Figure 1. The camera may be connected to a managed network, a switch, or directly to your computer.

Figure 1: Connect the Ethernet

7.2 If applicable, connect a Type D Micro-HDMI cable to J16 as shown in Figure 2. The HDMI cable may connect to an HDMI monitor or a capture card.

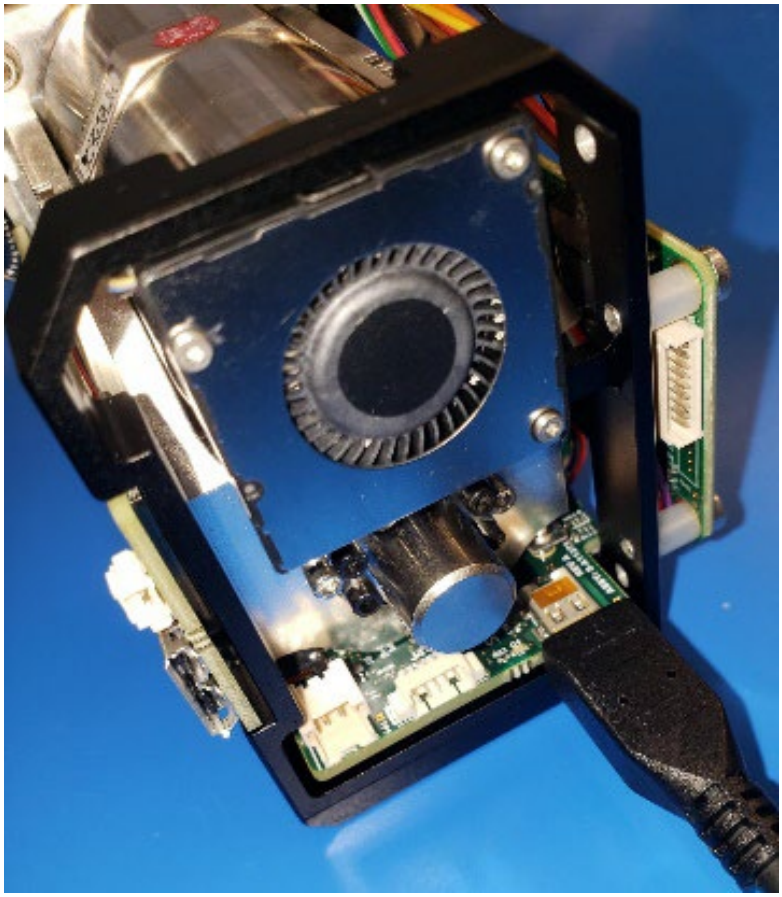

Figure 2: Connect the HDMI

7.3 Connect the Sherlock-terminated power cable to J1 as shown in Figure 3.

NOTE: Figure 3 shows the Power connection only. It does not show the HDMI cable installed, but that cable should be installed at this point in the procedure, if HDMI output is to be used.

The nominal input voltage is 12VDC (max 14V). At 12.0V input, and ambient room temperature, the camera can draw as much as 1.85A during cooldown, and after the sensor has reached operating temperature, the typical steady-state operating current is approximately 1.0A. The HDMI-SDI adapter option adds approximately 0.1A to these figures, and the camera can also draw 5 – 10% more current at elevated ambient temperatures.

Figure 3: Connect the Power

8 CONNECT TO WIND VIEWER

8.1 Establish an IP Connection

8.1.1 Install WIND Viewer from the USB Delivery drive and launch the program.

NOTE: SLA serial numbers as they appear in this list are not true serial numbers but a portion of the unit's MAC address. They may be used as identifiers but are not guaranteed to be unique.

All available SLA-equipped cameras on the network will appear in this list, identified by IP address and serial number. The camera has been preconfigured to obtain an IP address automatically from a DHCP server or from link-local addressing.

When the camera has initialized (approximately 45 seconds after power ON), it will be available to WIND Viewer for connection.

8.1.2 Locate and select the camera in the Connection drop-down list.

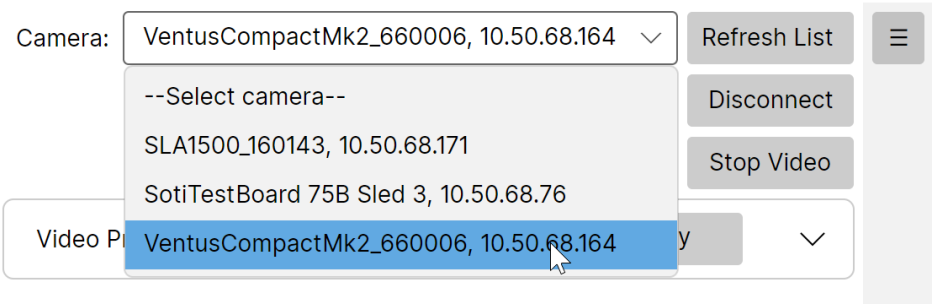

Figure 4: Connection Dropdown

8.1.3 If your camera does not appear in the list, do steps 8.1.4 through 8.1.6.

8.1.4 Verify the camera is initialized, it should be after approximately one-minute.

8.1.5 Click **Refresh**.

8.1.6 Make sure that your computer is on the same subnet as the camera.

8.1.7 Connect to the camera by selecting it from the drop-down and click **Connect**.

When the Connect button changes to Disconnect, you have successfully established connection.

8.2 Steam Video

The camera has been configured to stream H.264 immediately over UDP to the local computer's IP address on port 15004; live video should appear in the WIND Viewer main window. Video streaming may be more intricately configured through the full communication protocol.

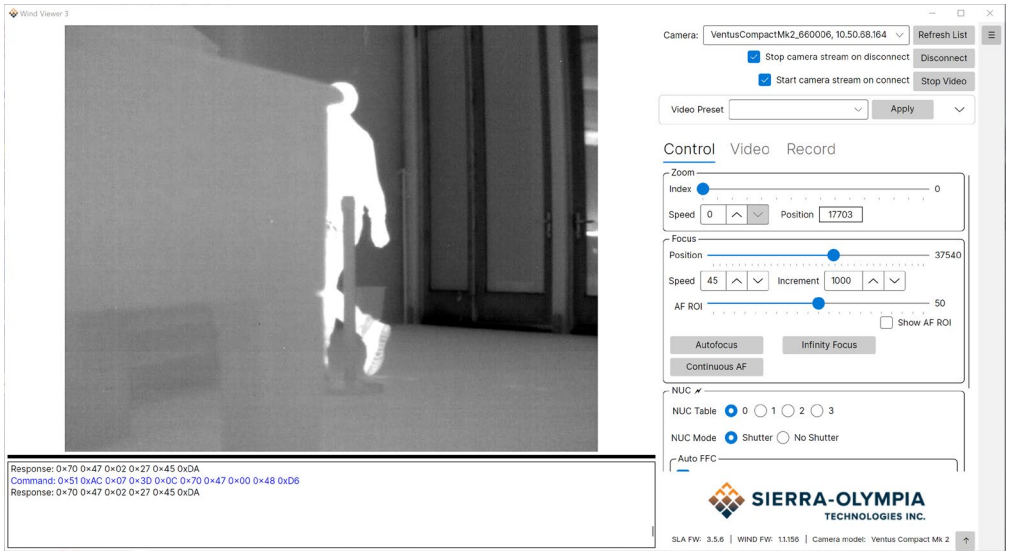

Figure 5: WIND Viewer Main Window

Set up is complete and the camera is ready to be used and tested. Explore all camera functions in WIND Viewer. There is nothing in this application that can damage the camera or is irreversible.

8.3 Camera Operation

8.3.1 NUC Tables

The Ventus Compact and Ventus Compact Mk2 have multiple modes that correspond to 2-point (gain) NUC tables and integration times. The Ventus Compact and Ventus Compact Mk2 are calibrated with through-lens NUC at the integration times listed in the tables below. It is recommended to change modes based on scene temperature / photon flux. In general, longer integration times are better for colder scenes.

Recommended scene temperatures are based on 10-90% well-fill. Actual starvation/saturation temperatures are affected by various factors including atmospheric conditions and range.

On Wind Firmware 1.1.170 and earlier, table 0 is default. On Wind Firmware 1.1.172 and later, the default table is set by the DefaultNUCTable param in the SotiParams.xml file, located in the /home/slroot/soti directory.

SL-VMN-275-10 and SL-VMN-N00 (Ventus Compact mk1)			
NUC Table	**Integration Time**	**Calibration Temperature**	**Recommended Scene Temperature, ~1km target**
0	4ms	30 to 70C	10 to 110C
1	10ms	10 to 50C	-20 to 70C

SL-VMN-275-12 and SL-VMN-275-13 (Ventus Compact mk2)			
NUC Table	**Integration Time**	**Calibration Temperature**	**Recommended Scene Temperature, ~1km target**
0	4ms	50 to 90C	10 to 110C
1	10ms	20 to 60C	-20 to 70C
2	16ms	10 to 40C	-40 to 60C

8.3.2 Flat Field Correction (FFC)

Flat Field Correction (FFC) is a feature used to calibrate the camera to a 'known' thermally uniform baseline to account for sensor drift or non-uniformities introduced by environmental conditions/gradients. For example, a lens installed near a thermal emitter may be warmer on one side than the other and cause one side of the image to be darker or lighter.

An FFC requires the camera FOV to be consumed by a thermally uniform target. Because the Ventus Compact cameras do not have an internal shutter/target, FFCs are performed by placing a (or steering the camera towards a) uniform target such as non-reflective metal plate or the sky and defocusing the lens. The WIND Firmware provides a feature ("Blur FFC") to perform this as an automatic routine.

It is recommended to perform a FFC on boot up after cooldown is complete, each time the NUC table is changed, and during dynamic environmental/operating conditions.

8.3.3 Image Adjustment

The Ventus Compact cameras use a Sightline video encoder for video processing, including Automatic Gain Control (AGC). The AGC is what functionally controls image brightness/contrast, and its operation is crucial for delivering video which is detailed, unsaturated, and has pleasing contrast.

The detector in the camera outputs its total digital dynamic range to the Sightline with 16-bit resolution. The Sightline then uses the AGC algorithm to select lower/upper bounds of that 16-bit range and remap into 8-bits the information within those bounds. Without the AGC controlling the compression of the 16-bit dynamic range, the resulting display imagery would appear 'flat' with very little tonal resolution. Thus, the width of the bounds is what controls *contrast (or 'gain')* and the offset of the bounds is what controls *brightness (or 'level')*.

Lower/upper bounds are set by measuring the intensity mean and standard deviation of a region of interest (ROI) within the image frame. They are calculated as follows:

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[ROI mean + brightness bias] +/- [ROI standard deviation * (2+contrast bias)]
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Where the brightness/contrast bias correlates to the brightness/contrast controls in PanelPlus/WIND Viewer (or SLASetADCParameters in the SLA IDD). By default (with brightness/contrast = 128), the autogain algorithm evaluates the ROI histogram, clips it off at +/- 2 standard deviations from the mean, and remaps that to 8 bits. *This happens every frame, unless the "freeze autogain" is enabled.* In this way, the AGC function acts like a free-running "auto exposure" for the camera (with the ADC brightness/contrast controls biasing the auto exposure). The "freeze autogain" setting may be useful when you wish to 'hold' the current exposure.

It is typical to use the ROI to compensate for scenes of non-uniform contrast. For example, a landscape scene may have (cold, uniform) sky in the top half of the image frame, and (warm, contrasty) Earth in the bottom half of the image frame. An ROI which subtends the whole frame may be biased towards increasing contrast to compensate for the low-contrast sky. If it is more

important to have an image well-tuned for viewing terrestrial subjects, it is useful to set the ROI to the bottom half of the frame.

Sightline has contrast enhancement features such as CLAHE and LAP (as well as convolution-based sharpening). Experimenting with these enhancement features is recommended to achieve the best imagery for the scene.

Additional information on image enhancement and adjusting gain and contrast can be found in the following Sightline application notes (www.sightlineapplications.com):

EAN-Infrared-Temperature

EAN-Enhancement

9 INTEGRATION CONSIDERATIONS

- The Ventus Compact dissipates ~10W of heat and the Ventus Compact Mk2 dissipates ~11.5W of heat, please see the corresponding mechanical ICD for heatsinking surfaces. When enclosed, stirred air is recommended, the volume wall should promote conduction to ambient air.
- The lens mount has a ¼-20 tripod mount for convenience of demonstration. In integration it is recommended to use the M3 tapped holes on the lens mount
- The Ventus Compact Mk2 lens has a focus transition region, to learn more about this see 50-90004

10 VENTUS COMPACT MK2 CORE (VMN-275-02)

The Ventus Compact Mk2 Core does not have a Sightline so the lens and sensor will need external power, see 65196-ZoomLens19-275mmUserManual and 102-2020-40 Neutrino LC Engineering Datasheet for connector information. An adapter board, PN S-A11290, is available that provides USB and Camera Link video from the sensor.

10.1 NUC Tables

The VMN-275-02 calibrated with through-lens NUC at the integration times listed in the tables below, these are done in the sensor with the lens in the narrow field of view position.

VMN-275-02 NUC Table	Integration Time	Calibration Temperature
0	4ms	50 to 90C
1	10ms	20 to 60C
2	16ms	10 to 40C

11 REVISION HISTORY

Revision	Date	Description	ECO
A	2022/04/12	Initial release.	1202
B	2023/11/16	Added Ventus Compact Mk2 and updated WIND Viewer images	1619
C	2024/01/24	Update cable section and add reference for EAN for Mk2 lens	1688
D	2025/03/10	Update section 8	1838