

N I C O N \ V A L K Y R I E



REFERENCE GUIDE

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Revision 2

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About this guide

About this guide

This guide provides reference information and technical specifications for Vicon Valkyrie cameras.

- [Introducing Vicon Valkyrie systems, page 5](#) provides an introduction to Valkyrie systems and their components.
- [Vicon Valkyrie cameras and connections, page 13](#) contains reference information about Valkyrie cameras, including details such as the camera lens, connection and mounting points, descriptions of the status lights and display, and cabling.
- [Build a Vicon Valkyrie system, page 55](#) describes the topology of a simple Valkyrie system, and how to extend it to include more cameras, a Vicon Lock and supported FLIR cameras. Also covered is how to include older Vicon cameras in a Valkyrie system.
- [Vicon Valkyrie technical specifications, page 83](#) contains detailed specifications for each of the Valkyrie variants, the camera lens, and the strobe unit.
- [Vicon Valkyrie regulatory, safety and warranty information, page 108](#) is also included.

Introducing Vicon Valkyrie systems

Introducing Vicon Valkyrie systems

A Vicon Valkyrie system is a suite of networked Valkyrie motion capture cameras, hardware devices such as Ethernet switches and Vicon Locks (for synchronization of third-party devices), and software applications, which provide real-time and offline digital-optical motion capture data.

Valkyrie systems are flexible, expandable, and easy to integrate into your working environment. You can combine Valkyrie motion capture cameras with other current Vicon camera ranges and supported third-party devices (such as supported FLIR cameras, force plates, EMG, analog and digital HD- and SD-compliant external video for genlocking and associated timecode sources) to create a system that meets your application requirements. This modular approach enables you to expand your Vicon Valkyrie system as needed.

Motion capture data from the Valkyrie cameras (VK26, VK16, and VK8) and the associated data from third-party devices routed through an optional Vicon Lock unit, connects through a PoE++ (advanced Power over Ethernet) switch to a host PC, which runs the required Vicon application software. Other third-party devices, such as digital force plates, can connect directly to the host PC.

Valkyrie cameras can also be added to other current Vicon camera systems (Vantage, Vero and Viper).

Important

A Valkyrie system runs on its own dedicated network, rather than being integrated into a general communications network.

More information:

- For a list of the major components of Valkyrie systems, see [Vicon Valkyrie system components, page 6](#).
- For further details about all aspects of Valkyrie cameras, see [Vicon Valkyrie cameras, page 14](#).
- For illustrations of basic example Valkyrie systems, showing how you can include Vicon Valkyrie cameras, appropriate switches, Vicon Locks, and supported FLIR cameras, see [Build a Vicon Valkyrie system, page 55](#).
- For more information on including supported external devices in your Valkyrie system, see the *Vicon Systems Setup Guide* and/or the Vicon Lock guides.
- To find out about using your Vicon application software, select the links from the Help menu in the software or view the relevant documentation on the [Vicon documentation website](#)¹.

¹ <https://docs.vicon.com>

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Vicon Valkyrie system components

The major components of a Vicon Valkyrie motion capture system are:

- [Vicon Valkyrie motion capture cameras, page 9](#)
- [Vicon Valkyrie switches, page 9](#), which provide the power source and connectivity
- [Vicon software, page 10](#) to control the cameras, analyze and present the data
- [Host PC, page 10](#) to run the software

A Valkyrie system also includes [Valkyrie system cables, page 11](#) to connect the hardware devices, a [Vicon calibration device , page 11](#) (such as a Vicon Active Wand), and Vicon accessories (markers, tape, etc).

You may also choose to include compatible FLIR cameras and/or other third-party devices such as force plates and accelerometers, which require a current [Vicon Lock unit, page 11](#).

In each Valkyrie system, one [synchronization source, page 12](#) provides synchronization to the rest of the system.



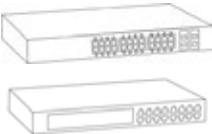
Note

Except where noted, references to Vicon Lock, Lock units, and Lock apply to all current models of the Vicon Lock unit (at the time of publication, this includes Vicon Lock Studio and Vicon Lock Lab).

You can expand and upgrade your Vicon Valkyrie system as required. In addition to being compatible with current Vicon camera ranges such as Vero and Viper, the Valkyrie system is also compatible with Vantage cameras, so if you have an older system, you can build on your existing investment. (However, if you add Valkyrie cameras to a system comprising MX T-Series cameras, the T-Series cameras will not work.)

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The following table identifies commonly used components of Vicon Valkyrie systems.

Component	Description	Further information
	Vicon Valkyrie camera	Vicon Valkyrie motion capture cameras, page 9
	Vicon Vero camera	Vicon Vero Quick Start Guide (PDF)
	Vicon Viper camera	Vicon Viper Quick Start Guide (PDF)
	Vantage camera	Vicon Vantage Quick Start Guide and the Vicon Vantage Reference Guide (also available as a PDF)
	Supported FLIR cameras	Add supported FLIR cameras to a Vicon Valkyrie system, page 67 and the documentation that accompanied the latest release of your Vicon application software. Vicon system setup information² on the Vicon documentation website
	Vicon-supplied PoE++ and PoE+ switches (plugged into mains socket)	Vicon switches, page 9
	Vicon Lock unit (plugged into Vicon switch)	<ul style="list-style-type: none"> Supported FLIR cameras require a Lock Studio or Lock Lab. VESA Stereo genlocking requires a Lock Studio or Lock Lab. Digital SDI genlock requires a Lock Studio. Analog devices require a Lock Lab. Vicon Lock (optional) for third-party devices, page 11

² <https://docs.vicon.com/display/Connect/Vicon+system+setup+information>

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Component	Description	Further information
	Vicon-supplied SFP+ switch	Often used in addition to PoE++ switches for systems larger than eight Valkyrie cameras (see Extend a basic Valkyrie system, page 61)
	Vicon Valkyrie host PC (with Vicon application software).	Vicon Valkyrie host PC, page 10 For the latest full spec, visit the PC specifications ³ page on the Vicon website.
Vicon-supplied cables	The types of cable may include: <ul style="list-style-type: none"> • Shielded Cat 6 (minimum) RJ45 Ethernet cable • 10 Gb SFP+ Direct Attach Cable • Lock-to-Lock Link cable 	Vicon Valkyrie system cables, page 11 SFP+ transceivers may also be included.
	Vicon software download	Vicon Valkyrie software, page 10
	Vicon calibration device (Active Wand)	Vicon calibration device in the <i>Vicon Systems Setup Guide</i>
	Motion capture accessories (such as markers)	Accessories ⁴ page on the Vicon website
Third-party devices (optional)	Third-party devices, such as accelerometers and force plates	Vicon Lock (optional) for third-party devices, page 11

If your particular application requires a more complex configuration, contact [Vicon Support](#)⁵.

³ <https://www.vicon.com/support/faqs/?q=what-are-the-latest-pc-specifications>

⁴ <https://www.vicon.com/hardware/accessories/>

⁵ <https://www.vicon.com/support>

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Vicon Valkyrie motion capture cameras

Vicon offers a wide choice of motion capture cameras which feature multiple high-speed processors that perform real-time image processing.

You can include the following cameras in your Valkyrie system:

- Valkyrie VK26, with a resolution of up to 26.2 megapixels (5120 x 5120) and capture speed of 150 fps
- Valkyrie VK16, with a resolution of up to 16.1 megapixels (5120 x 3152) and capture speed of 240 fps
- Valkyrie VK8 , with a resolution of 8.0 megapixels (3712 x 2176) and capture speed of 500 fps
- Currently supported FLIR cameras (for details, see the latest documentation for your Vicon application software)
- Current Vicon optical camera ranges (Vero, Viper and Vantage) cameras

For further details of Valkyrie cameras, see [Vicon Valkyrie cameras, page 14](#) and [Vicon Valkyrie technical specifications, page 83](#).

Vicon Valkyrie switches

To benefit from the power and range of Vicon Valkyrie cameras, connect each Valkyrie camera to a PoE++ port of a PoE++ switch.

Supported FLIR cameras can also be connected to a switch via a Vicon Lock. Note also that:

- Each Valkyrie camera must connect to a port enabling it to draw 25.5 W when connected to PoE+ port (IEEE 802.3at-2009) or 35 W when connected to PoE++ port (IEEE 802.3bt-2018). To benefit from the Valkyrie's power and range, ensure all the Valkyrie cameras are connected to higher spec (PoE++) ports.
- Lock units can either connect to the same type of PoE++ or PoE+ port as the Valkyrie cameras or to a port of lesser standard conforming to IEEE 802.3 af (12.95W PoE) . This connectivity through Vicon-supplied cables carries both Gigabit communications and power.
- A PoE++ or SFP+ switch (known as the primary switch), which may be obtained from Vicon, connects to the host PC running the Valkyrie software that enables you to capture and analyze your data. Note that no power is required on this particular port of the switch.

For information on connecting older system components, see [Set up a mixed Valkyrie system with Vantage or Vero cameras, page 78.](#))



Important

Although Valkyrie cameras are IP65-rated, the other components of your Valkyrie system (switches, Locks, other cameras, etc) may not be, so ensure that these components are not exposed to unsuitable environmental conditions.

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The number and type of switches required depends on the number of cameras to be supported. For a description of the types of switch that may be included in a Valkyrie system, see [Switches in Valkyrie systems, page 65](#).

For examples of how to connect Vicon switches, see [Example Vicon Valkyrie systems, page 71](#).

Vicon Valkyrie host PC

The Vicon Valkyrie host PC runs the Vicon motion capture software that analyzes and presents the data captured by the Valkyrie cameras.

Current Vicon computers contain dual 10-Gigabit Ethernet ports to enable the Valkyrie system to communicate with the installed Vicon application software. Depending on your system and your PC configuration, you can either route optical data (eg, from Valkyrie cameras) through one port and video data (eg, from Vicon video cameras) through the other; or video data and optical data can be delivered through a single port. The latter approach requires a Gigabit Ethernet PoE+ with a 10 GbE uplink. For more information, see the *Vicon Systems Setup Guide*.

Any Vicon motion capture and analysis software to be used with a Vicon Valkyrie system is installed on this Vicon Valkyrie host PC. For further details of this computer, visit the [PC specifications⁶](#) page on the Vicon website or see the *Vicon Systems Setup Guide*.

Remote PCs may be used for other Vicon software or supported third-party applications.

Vicon Valkyrie software

The use of Vicon Valkyrie is supported in the following versions (and later) of Vicon motion capture software:

- Evoke 1.6
- Nexus 2.15
- Shogun 1.9
- Tracker 3.10 and Tracker 4.0

The motion capture software is installed on the host PC. For further details on the software, see the Help menu in your Vicon application software and the documentation on [docs.vicon.com⁷](#).

Vicon also provides a range of data visualization, analysis, and manipulation software (for details, see the [Software⁸](#) page on the Vicon website).

⁶ <https://www.vicon.com/support/faqs/?q=what-are-the-latest-pc-specifications>

⁷ <https://docs.vicon.com>

⁸ <https://www.vicon.com/products/software>

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Vicon Valkyrie cables

A combination of proprietary Vicon and commercially available cables is used to connect hardware devices in a Vicon Valkyrie system.

For further information, see [Vicon Valkyrie system cables, page 43](#).

Vicon calibration device

A Vicon proprietary calibration device is used to calibrate Vicon Valkyrie systems.

For further information, see the documentation for your [Vicon Active Wand⁹](#) on the Vicon documentation website.

Vicon Valkyrie accessories

Motion capture accessories for both traditional motion capture (such as retroreflective markers, Micropore tape, etc) and LBVR systems are available.

For further information, see the [Accessories¹⁰](#) page on the Vicon website.

Vicon Lock unit (optional) for third-party devices

With the addition of a Vicon Lock unit to your Vicon Valkyrie system, you can include the following third-party devices:

- Supported FLIR cameras
- Analog peripheral devices, such as force plates, electromyography (EMG) equipment, and accelerometers
- Devices that require synchronization at a frequency that is related to the motion capture frame rate and/or a device that needs to know when a capture occurs
- Devices that need to start and stop the capture event, (Remote Start and Stop)
- Analog Standard Definition (SD), High Definition (HD) and (with Vicon Lock Studio) 3G SDI broadcast digital video devices to which the Vicon Valkyrie system must synchronize
- Analog broadcast timecode devices for triggering capture and time-stamping captured data in accordance with LTC and VITC standards
- VESA Stereo devices to which the Vicon Valkyrie system must synchronize

Important

Although Valkyrie cameras are IP65-rated, the other components of your Valkyrie system (switches, Locks, other cameras, etc) may not be, so ensure that these components are not exposed to unsuitable environmental conditions.

⁹ <https://docs.vicon.com/display/HD/Wands+and+other+Vicon+hardware+guides>

¹⁰ <https://www.vicon.com/hardware/accessories/>

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For more information on the role of Vicon Lock units in a Valkyrie system, see the relevant Lock quick start guide and the *Vicon Systems Setup Guide*.

For more information on connecting third-party devices to a Valkyrie system, see [Add a Vicon Lock to a basic Valkyrie system, page 62](#).

For a list of currently tested and supported third-party devices, contact [Vicon Support](#)¹¹ or your nearest agent or distributor.

Vicon Valkyrie synchronization source

As shown in the following table, each Valkyrie system has one sync source device that provides synchronization to the system. The sync source is established automatically during system booting.

If the system includes	The sync source is
Vicon Lock (or Vicon Beacon)	Vicon Lock (or Vicon Beacon)
No Lock or Beacon	A camera
Two Lock units	Lock unit with genlock source attached. If no genlock source is attached to either Lock, one is automatically designated the sync source.

For more information on the role of a Vicon Lock unit in a Valkyrie system, see 'Add a Vicon Lock to a basic Valkyrie system' in the *Vicon Systems Setup Guide*, or the relevant [Vicon Lock guide](#)¹².

¹¹ <https://www.vicon.com/support>

¹² <https://docs.vicon.com/display/Connect/Vicon+connectivity+%28Lock%29+device+guides>

Vicon Valkyrie cameras and connections

The following topics provide reference information about the cameras and cables that are included in Vicon Valkyrie systems.

- [Vicon Valkyrie cameras, page 14](#)
- [Vicon Valkyrie system cables, page 43](#)



Note

Except where noted, references to Vicon Lock, Lock units, and Lock apply to all current models of the Vicon Lock unit (at the time of publication, this includes Vicon Lock Studio and Vicon Lock Lab).

Vicon Valkyrie cameras and connections
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Vicon Valkyrie cameras

The following topics describe the role of Vicon Valkyrie cameras in a Valkyrie system, the available types of cameras, their physical structure (including lenses, controls and connectors, and associated strobe units) and explain their functional characteristics.

For more information, see:

- [Vicon Valkyrie cameras in a Valkyrie system, page 15](#)
- [Vicon Valkyrie camera range, page 19](#)
- [Vicon Valkyrie handling, connection and mounting points, page 22](#)
- [Vicon Valkyrie camera strobe units, page 25](#)
- [Vicon Valkyrie camera lens, page 27](#)
- [Vicon Valkyrie status lights and TFT LCD display, page 37](#)

For technical details of Vicon Valkyrie cameras, see [Vicon Valkyrie technical specifications, page 83](#).



Caution

Vicon Valkyrie cameras contain no user-serviceable components. For all servicing, and any alterations, you must return the camera to Vicon. Any attempt by you or any third party to alter or repair a Valkyrie camera may invalidate its warranty.

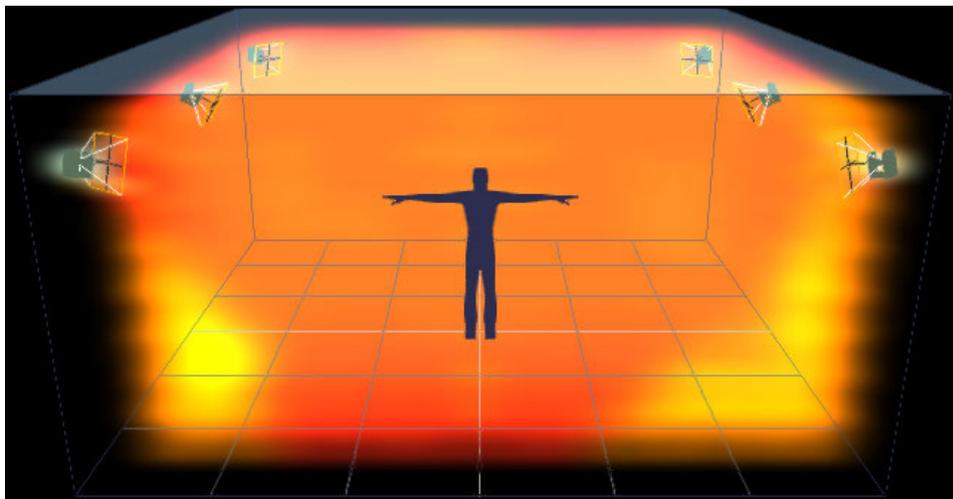
Vicon Valkyrie cameras and connections
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Vicon Valkyrie cameras in a Valkyrie system

Vicon Valkyrie cameras are purpose-designed motion capture cameras that use multiple high-speed processors to perform real-time proprietary image-processing. When Vicon cameras are in their normal motion capture mode, they output the movement of Vicon markers, rather than the subject to which the markers are attached. (To use the cameras in Video Preview mode, which is useful when you are setting up the cameras in the volume, see [Vicon Valkyrie Video Preview mode, page 17](#)). This is achieved with the combination of high-powered, narrow-band strobed illumination, retroreflective or active markers (which contain infrared active LEDs that are visible to the Vicon cameras), and a corresponding filter that is tuned to the same wavelength as the strobe.

Vicon markers can be retroreflective spheres that reflect light from the camera strobe units back into the Vicon motion capture cameras, or active markers, which contain infrared LEDs that are visible to the Vicon cameras. The markers are attached to a subject or object whose motion is to be captured. For information on the file types involved in Vicon motion capture and on how to position markers on your subjects in accordance with these files, see your Vicon application software documentation.

You position the cameras around the capture volume to ensure full coverage of the subjects whose motion you will be capturing. Data from at least two cameras is required to produce 3D reconstructions of the Vicon markers, so ensure that the placement and orientation of all cameras results in multiple cameras aimed at the same region of the capture volume, as shown in this image. For help in visualizing your volume camera coverage, try the [Vicon Visualization Tool](#)¹³ on the Vicon website.



Camera positions will depend on your volume size, camera type, and camera lens.

Depending on your capture requirements, you may choose to mount the cameras on tripods for floor-based cameras or on a clamp and truss on speed rails for raised cameras.

¹³ <https://www.vicon.com/visualization/>

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For more information, see also:

- [Vicon Valkyrie Video Preview mode, page 17](#)
- [Vicon Valkyrie accelerometer, page 17](#)
- [Vicon Valkyrie temperature sensors, page 18](#)
- [Vicon Valkyrie camera performance, page 18](#)

Vicon Valkyrie Video Preview mode

To help with setting up the cameras in a volume for positioning, focus, and field of view, you can set Valkyrie cameras, one at any one time, to Video Preview mode (for instructions, see the *Vicon Valkyrie Quick Start Guide* or the documentation for your Vicon application software).

Video Preview mode outputs a lower resolution image of the whole scene at approximately 30 fps (the exact rate is the closest multiple of the system frame period). It works best where there is good ambient light.

When the system frame rate is greater than the maximum frame rate achievable at full resolution (see [Vicon Valkyrie technical specifications, page 83](#) for the maximum frame rate for each camera variant), to enable you to see the same view as the camera in optical mode, the camera uses windowing to display the image. For this reason, we recommend that, while setting up your Valkyrie system, you reduce the system frame rate below the maximum. When you have finished setting up the system, increase the frame rate to its required setting.

Vicon Valkyrie accelerometer

Each camera is fitted with an accelerometer which has several purposes:

- Before the system is calibrated, you can tap the camera to alert the Vicon application software that you are setting up that particular camera. The software then responds accordingly.
- After the system has been calibrated, if the camera is accidentally knocked or bumped, an alert is sent to the Vicon application software so that you can take the appropriate action. You can change how hard the camera has to be knocked to cause it to report a bump by altering the **Bump Detection Sensitivity** or **Bump Sensitivity** control in the Vicon application software.
- The accelerometer also determines the orientation of the images in the Valkyrie display on the front of the camera.

Note the following limitations of bump detection:

- Bump detection is active only on calibrated cameras.
- Bump detection cannot detect movement that does not change the gravity vector, for example, slow translation with no rotation.
- Bump detection cannot detect movements that occur when the camera is not connected to a live system.
- The camera is detected as bumped when the reading from the accelerometer is sufficiently different from the last reading. Gradual changes (for example, a slipping camera mount) may not be detected until there is enough of a change to trigger a new notification.

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Vicon Valkyrie temperature sensors

Electronic temperature sensors in the camera body and strobe relay information back to the Vicon application software. This lets the user of the software know when the system has stabilized and that the system is ready for calibrating. If a problem occurs due to overheating, which is caused by too high an ambient temperature, the Vicon application software can inform the user of a potential problem.

You can change the required temperature range in the Vicon application software.



Caution

To avoid overheating, ensure that the environment in which the cameras are used is well-ventilated.

Vicon Valkyrie camera performance

Vicon Valkyrie cameras evaluate an entire image in grayscale, rather than applying a black and white threshold. This provides more information and increases motion measurement accuracy over an equivalent resolution black and white camera. The Vicon Valkyrie cameras perform the majority of data processing. They generate grayscale blobs from the retro-reflective markers in the capture volume and then use centroid-fitting algorithms to determine their accurate centers, or collate the whole grayscale data if the markers are deemed to be merged. This camera data is sent to the Vicon application software for further processing and viewing. For details, see your Vicon software documentation.

A number of factors affect the overall performance of your Valkyrie system. These include camera resolution, number of cameras, capture rate, and number of markers/subjects captured. All of these factors impact the overall data rate of your system and may affect the specification required for your Vicon Valkyrie host PC. Understanding the expected data rate can also help to inform you whether a standard single Gigabit Ethernet connection is sufficient or whether a configuration that involves link aggregation may be preferable.

You can specify the required frame rate in your Vicon application software on the Vicon Valkyrie host PC. Your Vicon application software remembers this setting and re-applies it on power up or from reset. You can also configure the buffering of camera data at the time of capture. For details, see your Vicon software documentation.

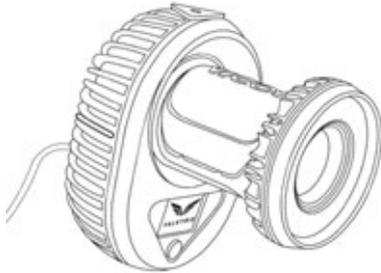
For a comparison of the performance of the models in the Vicon Valkyrie range of cameras, see [Vicon Valkyrie camera performance comparison, page 21](#).

Vicon Valkyrie cameras and connections
\\ Vicon Valkyrie cameras \\

Vicon Valkyrie camera range

Vicon Valkyrie systems can include any of the Valkyrie range of proprietary Vicon motion capture cameras: VK26, VK16, and VK8, as well as other current Vicon cameras.

The camera hardware design consists of a camera body, a strobe head unit, a lens, optical filter, and cable, as shown in the following image.



For more information, see:

- [Vicon Valkyrie camera resolutions, page 20](#)
- [Vicon Valkyrie camera performance comparison, page 21](#)

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Vicon Valkyrie camera resolutions

A single hardware design is built with different types of sensors and a proprietary Vicon varifocal (9.4–18.8 mm) lens to create a range of cameras with different resolutions, as shown in the following table.

Camera	Resolution
VK26	26.2 Megapixels
VK16	16.1 Megapixels
VK8	8.0 Megapixels

All Valkyrie cameras are fitted with sensitive solid-state sensors and are purpose-built to provide high-speed, low-latency motion capture. Vicon applies stringent checks to its cameras for linearity, sensitivity, and absence of jitter.

 **Caution**
Vicon Valkyrie cameras contain no user-serviceable components. For all servicing, and any alterations, you must return the camera to Vicon. Any attempt by you or any third party to alter or repair a Valkyrie camera may invalidate its warranty.

You can combine the various models of Vicon Valkyrie cameras within a single Valkyrie system to meet your application requirements for resolution and/or coverage. The VK26 camera offers the highest resolution of the Vicon Valkyrie cameras and the VK16 and VK8 cameras can provide higher camera counts within a fixed budget, giving increased coverage.

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Vicon Valkyrie camera performance comparison

Each Vicon Valkyrie camera is programmed with firmware to control its operation and to enable it to perform its own onboard grayscale processing. As all Valkyrie cameras use the same firmware, a mix of Valkyrie cameras with different image sensors can be connected to and run on the same system. The Valkyrie system automatically recognizes cameras when they are plugged in. A distributed architecture enables the camera software to be updated across the system network.

The following table illustrates the performance of each Valkyrie camera type. For full details, see [Vicon Valkyrie technical specifications, page 83](#).

	VK26	VK16	VK8
Sensor resolution H x V (pixels)	5120 x 5120	5120 x 3152	3712 x 2176
Sensor size H x V (mm)	12.8 H x 12.8 V, 18.1 (diagonal)	12.8 H x 7.88 V, 15.03 (Diagonal)	16.70 H x 9.79 V, 19.36 (diagonal)
Maximum frame rate (fps) at full resolution	150	240	500
Focal length (wide, 72°)	9.4	9.4	11.5
H FoV (wide)	72	72	72
V FoV (wide)	72	46	46
Focal length (narrow, 54°)	12.5	12.5	16.4
H FoV (narrow)	54	54	54
V FoV (narrow)	54	35	33
Pixel size	2.5 um	2.5 um	4.5 um

Note
 Vicon Valkyrie cameras are shipped with a focal length of 12 mm.

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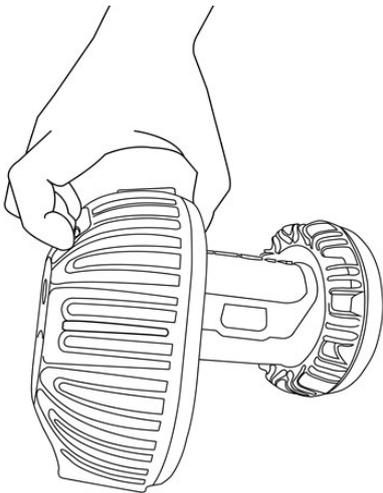
Vicon Valkyrie handling, connection and mounting points

These topics describe the Ethernet port that connects Valkyrie cameras to an Ethernet switch, and the options for mounting a Valkyrie camera.

- [Valkyrie grip point, page 22](#)
- [Valkyrie Ethernet connection, page 23](#)
- [Valkyrie mounting options, page 24](#)

Valkyrie grip point

Your Valkyrie camera has a grip point that enables you to pick it up and carry it without risking damage to the lens.

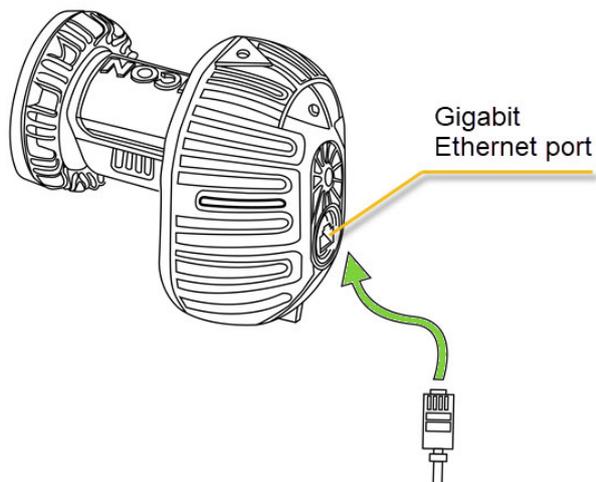


⚠ Caution: Do not pick up or carry the camera by the lens. Use the grip point at the top of the camera to pick up your Valkyrie camera.

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Valkyrie Ethernet connection

The following image shows the camera connection on the rear panel of a Vicon Valkyrie camera for connecting to an Ethernet switch.



The following single connection point is on the rear panel:

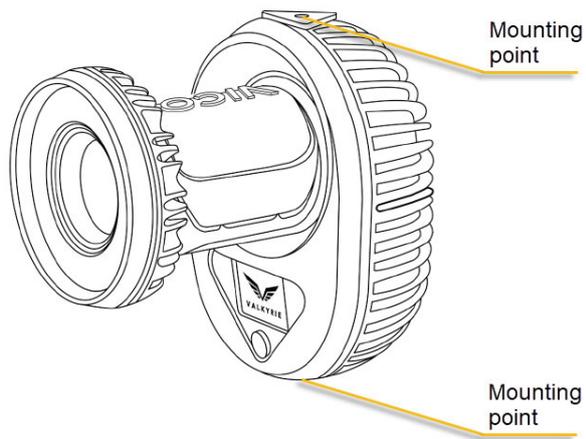
- Gigabit Ethernet port
RJ45 socket. Held in the housing mechanism and protected by an IP65 cable cap, a Vicon-supplied Cat 6 RJ45 Ethernet cable connects the Vicon Valkyrie camera to an Ethernet switch. The cable carries power, all data communications and sync.

⚠ Caution: To ensure Valkyrie cameras remain IP65-rated, if you remove the IP65 cable cap that protects the connection between the Ethernet cable and the camera, always replace it correctly. For instructions, see *Remove and replace IP65 cable cap* in the *Vicon Valkyrie Quick Start Guide*.

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Valkyrie mounting options

Both the underside and the top of the camera body contain mounting points, which have ¼" 20 UNC threaded holes. These are designed to match the common thread found on most tripod and wall mount fixing screws.



Warning: For safety and optimum performance, Vicon recommends that you use only stable tripods and wall mounts. For recommendations, contact your local Vicon office.

If you need to climb a ladder to mount your camera, always use a carry strap. For advice on this, contact [Vicon Support](#)¹⁴.

¹⁴ <mailto:support@vicon.com>

Vicon Valkyrie camera strobe units



Caution

Vicon Valkyrie cameras contain no user-serviceable components. For all servicing, and any alterations, you must return the camera to Vicon. Any attempt by you or any third party to alter or repair a Valkyrie camera may invalidate its warranty.

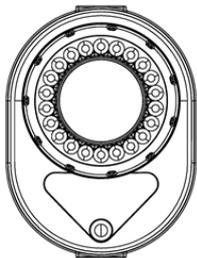
The strobe unit on the front of a Vicon Valkyrie camera (VK26, VK16 or VK8), uses powerful surface-mounted light-emitting diodes (LEDs) to illuminate the capture volume. The standard LEDs fitted to Vicon Valkyrie camera strobe units emit infrared (IR) light at 850 nm. This is only slightly visible to the naked eye in very dark surroundings. For information about other LED wavelengths, please contact Vicon Sales or your nearest agent or distributor.

In your Vicon application software on the Vicon Valkyrie host PC, you can set each camera's strobe duration individually or set all the camera strobes together. From then on, your Vicon application software remembers these settings and re-applies them on power up or from reset.



Warning

Do not look directly at the source when an Infrared (IR) strobe unit is in operation.



The strobe unit emits a powerful flash of light once per video frame at precisely the same time as the image sensor's global electronic shutter opens. This flash illuminates the retroreflective markers attached to the motion capture subject. The reflected light passes back through the lens and optical filter. The spectral characteristics of the filter ensure that only light with the same wavelength as the LEDs passes back into the camera.

In the camera, the lens collects the light and forms a focused image of the markers on the camera's image sensor plane. The camera electronically converts the pattern of light into data that ultimately represents the position and radius of each marker in the image. For more information on the filters and lenses supplied, see [Vicon Valkyrie camera lens, page 27](#).



Tip

When the cameras are used outdoors, try to position the cameras to minimize the ambient light as the filter cannot distinguish ambient light of the same wavelength as that of the strobe.

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Valkyrie secondary optics

To spread the light from the LEDs to match the field of view of the camera lens and therefore the capture volume, Valkyrie strobe units come with secondary optics that fit over the LEDs. Each LED effectively sits inside its own secondary lens. These secondary optics produce a wide angle light spread.

To obtain a narrower light spread, you can remove the secondary optics. This enables you to best match the light spread to the field of view obtained with the focal length setting of the lens.

Note

Vicon Valkyrie cameras are shipped with a focal length of 12 mm.

For focal lengths that give an angle of view of 54° or narrower, we recommend that you remove the secondary optics.

For more information on fields of view and focal length, see [Field of View, page 28](#) and [Vicon Valkyrie cameras lens specifications, page 102](#).

Remove and replace secondary optics

For information on how to remove and replace secondary optics and how to align them correctly with the strobe LEDs, please contact [Vicon Support](#)¹⁵.

¹⁵ <mailto:support@vicon.com>

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Vicon Valkyrie camera lens

The function of the camera lens is to collect reflected light from a scene and to form a focused image on the camera's sensor plane. The lens that has been developed and fitted to your Vicon Valkyrie camera offers optimal data quality and provides a view angle that is appropriate for your requirements. The type of lens that will provide optimum performance for a particular application depends on factors such as the field of view (FOV), image circle, aperture and depth of field, and any lens filter fitted. For descriptions of these, see [Camera lens characteristics, page 28](#), which provides a basic description of the most important functional lens characteristics.

The proprietary Vicon lens designed for Vicon Valkyrie cameras has been custom-built for motion capture. It has a large image circle to ensure that the entire image—not just the center—is evenly illuminated.

Other commercially available lenses are not necessarily designed to work with high resolution cameras; they tend to have a limited resolving power, and are more suitable for sensors with a resolution of less than two megapixels. As a result, when capturing with markers close together, the lens can have difficulty resolving the gap between the markers, causing merging even when the focus is optimal. For full specifications, see [Vicon Valkyrie technical specifications, page 83](#) and for information on focusing, see [Focus a Vicon Valkyrie camera lens, page 33](#).



Caution

Vicon Valkyrie cameras contain no user-serviceable components. For all servicing, and any alterations, you must return the camera to Vicon. Any attempt by you or any third party to alter or repair a Valkyrie camera may invalidate its warranty.

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Camera lens characteristics

The following topics describe the factors that affect lens types:

- [Field of View, page 28](#)
- [Image circle, page 29](#)
- [Aperture and depth of field, page 31](#)
- [Camera lens filters, page 32](#)

Field of View

The most important factor that distinguishes the Vicon Valkyrie camera lens is the total area that the camera can see. This is called the Field of View (FOV).

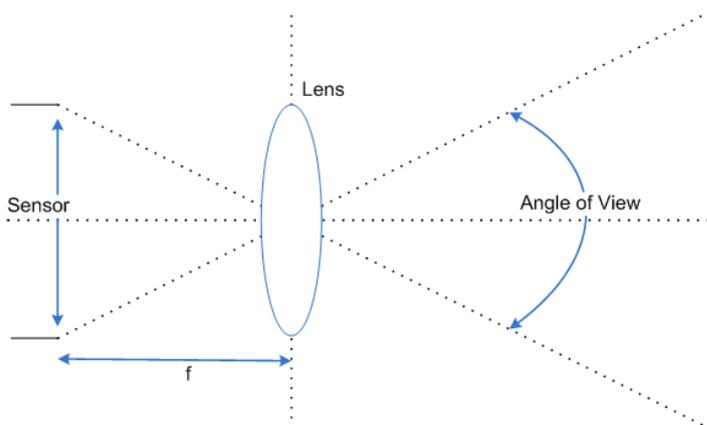
The scene that comprises the FOV has horizontal width (H) and vertical height (V). Knowing the distance (L) between the camera and a plane that defines the total FOV helps to select the type of lens to meet a particular application.

Lenses are described in terms of their focal length (f), defined as the distance in millimeters that the center of the lens must be from the sensor plane surface to project a sharp image on the sensor. The focal length of a lens is often given on the body of the lens or around the surround of the glass element at the front of the lens as well as in the lens documentation and packaging.

Note

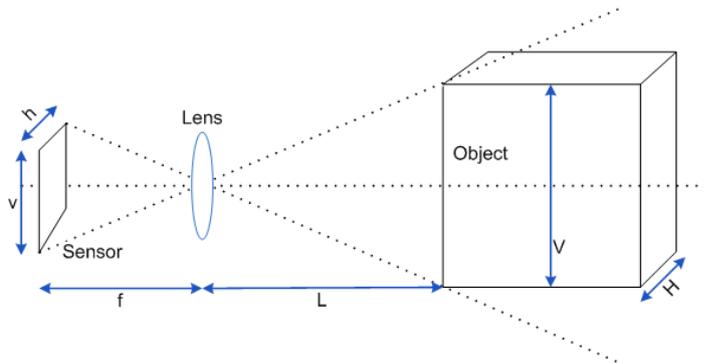
Vicon Valkyrie cameras are shipped with a focal length of 12 mm.

The focal length determines the angle of view (AOV) through the lens, as shown in the following diagram:



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Normally, the AOV is calculated based on the known focal length and sensor size. This in turn determines the FOV, based on the distance (L) to the object being captured, as shown in the following diagram.

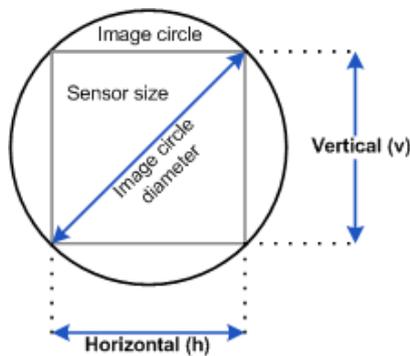


The sensor area used for capturing data through a Valkyrie camera determines the maximum FOV available for this combination of camera and lens. The area of the sensor is determined by its horizontal width (h) and vertical height (v).

The capture frame rate for each Vicon Valkyrie camera can be configured in the Vicon application software. The configured frame rate will also affect the field of view. Higher camera frame rates may make windowing of the sensor necessary, such that the sensor area used for capture is reduced in comparison to lower camera frame rates. For full details, see [Vicon Valkyrie technical specifications, page 83](#).

Image circle

Another characteristic of the camera sensor is the image circle. This is the sharp circular image that the camera lens casts onto the sensor, as shown in the following image.



The diameter of this image circle is the maximum area of usable quality image that the lens can produce. Most lenses produce their best image at the center of the lens, dropping off in performance towards the outer extremes of the lens. This results in a gradual darkening towards the edges of the image, known as vignetting. Vignetting gets worse for wider angle lenses and for wider open apertures, but the area at which vignetting starts to occur depends on the lens.

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Thus, for optimum performance, the image circle projected should be larger than the sensor area used by the camera. This ensures that the entire sensor is utilized and eliminates the fall-off of light that occurs towards the edge of the image circle. If the image circle of a lens is too small for the sensor size, then the camera image around the edges and corners is lost. Vicon Valkyrie cameras are fitted with a lens that has an appropriately sized image circle for the sensor.

⚠ Caution
 Vicon Valkyrie cameras contain no user-serviceable components. For all servicing, and any alterations, you must return the camera to Vicon. Any attempt by you or any third party to alter or repair a Valkyrie camera may invalidate its warranty.

The relationship between image circle (sensor size) and lens defines two of the most important optical properties: Field of View and Angle of View.

The following table gives the formulae used to calculate the angle of view (AOV) and field of view (FOV) for camera and lens combinations. These formulae require the dimensions of the sensor area used for each of the Valkyrie cameras at different frequencies.

Horizontal AOV (°)	Vertical AOV (°)	Horizontal FOVWidth H (m)	Vertical FOVHeight V (m)
$2 \times \text{Tan}^{-1} (h/2f)$	$2 \times \text{Tan}^{-1} (v/2f)$	$h \times L/f$	$v \times L/f$

where:

- f = focal length of the lens (mm)
- h = horizontal width of sensor (mm)
- v = vertical height of sensor (mm)
- L = distance from the lens to the object (m)

For sensor size details, see [Vicon Valkyrie camera range, page 19](#).

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As an example, consider a Valkyrie VK26 camera with a focal length of 12 mm operating at 150 fps at a distance of 9 m from the target markers. Given the VK26 sensor size (12.8 mm (H), 12.8 mm (V)), you would calculate:

Horizontal AOV:	$2 \times \text{Tan}^{-1} (12.8/(2 * 12)) = 56.14^\circ$
Vertical AOV:	$2 \times \text{Tan}^{-1} (12.8/(2 * 12)) = 56.14^\circ$
Horizontal FOV at 9m:	$0.0128 \times (9/0.012) = 9.60 \text{ m}$
Vertical FOV at 9m:	$0.0128 \times (9/0.012) = 9.60 \text{ m}$

⚠ Important
 These formulae take into account only the optical components of the camera and lens, thus they calculate the maximum possible theoretical Field of View from this combination. Poor illumination of the volume by camera strobes, less than optimal aperture or gain settings, or poor marker surface quality might all reduce the FOV in which a camera can recognize a marker below this maximum theoretical level.
 When using these formulae, note that for frame rates above the full-resolution rates given for Valkyrie cameras in [Vicon Valkyrie camera performance comparison, page 21](#), the sensor area is reduced due to windowing, as described in [Field of View, page 28](#).

Aperture and depth of field

Another significant factor that differentiates lens types is the aperture (also known as the f-stop value, f-number, and F#).

The aperture is the ratio of the focal length of the lens to the diameter of the lens opening, which determines the amount of light that can pass through the lens. Smaller f-stop values (eg, f2, f2.8) represent wider apertures that allow more light to pass through, while larger f-stop values (eg, f11, f16, f22) represent narrower apertures that allow less light to pass through. Typically, faster lenses have larger diameter optics that can pass more light.

Each f-stop value changes the lens opening from the next f-stop by a factor of 2. For example, decreasing the aperture from f11 to f8 allows twice as much light to pass through. Increasing the aperture from f11 to f16 allows half as much light to pass through.

The aperture and magnification affect the depth of field, that is, the portion of the image that has sharp focus. Immediately surrounding this area, there is a region in which the image remains in focus. Outside of this area, moving towards or away from the lens, the focus becomes progressively less sharp and the image appears out of focus. Thus, as the aperture and focal length decrease, the depth of field increases. Conversely, as the aperture and focal length increase, the depth of field decreases.

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Camera lens filters

To optimize the performance of the Valkyrie cameras, each lens is fitted with an optical filter that attenuates wavelengths of light other than the narrow passband required to pass the light emitted by the light-emitting diodes (LEDs) from the Valkyrie strobe unit and reflected back from the markers to the camera.

- ✔ **Tip** When the cameras are used outdoors, try to position the cameras to minimize the ambient light as the filter cannot distinguish ambient light of the same wavelength as that of the strobe.

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Focus a Vicon Valkyrie camera lens

The following topics explain how to focus a Vicon Valkyrie camera lens.

- [Understand lens focus methods, page 34](#)
- [Adjust camera lens focus with front focus ring, page 35](#)

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Understand lens focus methods

Vicon Valkyrie cameras are in focus when the images of markers seen by the camera at a distance representative of the capture distance (that is, the distance between subject and camera) are clear and sharp. The degree of focus of the lens on a Valkyrie camera can be controlled by altering two characteristics of the lens:

- Front (or forward) focus
This is set by adjusting the focus ring at the front of the lens. This type of adjustment is typically made when initially configuring and subsequently checking your cameras for capture. This procedure is described in [Adjust camera lens focus with front focus ring, page 35](#).
- Back focus
This is set by adjusting the position of the entire lens closer to or further away from the camera sensor along the axis of the lens. This sets the distance between the rear lens element and the sensor. This type of adjustment is required only to ensure that the lens focus ring matches what is actually in focus. Vicon makes this adjustment when initially setting the camera up.

Caution

As back focusing is a delicate operation, it must be performed by qualified and experienced persons only. For this reason, if you require a change in the back focus of your cameras, please contact [Vicon Support](#)¹⁶.

You can see the results in real time while you are focusing the camera by viewing the marker images in your Vicon application software.

¹⁶ <mailto:support@vicon.com>

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Adjust camera lens focus with front focus ring

You can sharpen the camera lens focus by adjusting the focus ring on the camera lens.



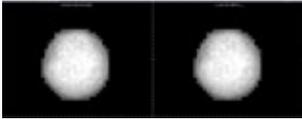
You can see the results while you are focusing the camera by viewing the marker images in your Vicon application software, in a **Camera** view pane. The following procedure briefly describes how to view the live camera data in your Vicon application software. For full details of the software steps, see the documentation for your Vicon application software.

To adjust camera lens focus with the front focus ring:

1. Hold the camera body (not the lens), and carefully unclip the IP65 lens cover from the lens. (You may find it easiest to unclip one side of the cover first, and then ease off the cover from the other side.)
2. Mount the camera on a tripod within reach of the Vicon Valkyrie host PC on which the Vicon application software is installed.
3. Ensure that you can view the camera data from the Vicon application software on the Vicon Valkyrie host PC. For details on doing this, see the documentation for your Vicon application software.
4. Place a selection of markers of the type you will use during motion capture central to the camera Field of View and at a distance from the camera representative of the capture distance, for example, some in the middle of the capture volume and some at a greater distance from the camera.
5. Ensure that the lens aperture is at its most open setting, that is, it is set to the lowest numerical value on the aperture ring.
 This lets more light into the camera and minimizes the depth of field (for details, see [Aperture and depth of field, page 31](#)).
6. In the Vicon software, check the marker images from this camera (for details, see the documentation for your Vicon application software), ensuring that you achieve the best balance between the near and far markers.

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7. In the Vicon software, observe the sharpness of the image of the markers; slowly adjust the front focus ring of the camera lens until the markers appear in sharp focus in the software, as shown in the following illustration.



8. In the Vicon software, zoom out and check that other markers of interest distributed around the volume are also in focus.
9. When focusing is complete, to ensure the focus stays at the desired level, with your fingers tighten the locking screws that lock the focus ring and aperture.

⚠ Caution

If the locking screws are not sufficiently tightened, the weight of the lens can cause the rings to move. Ensure the locking screws are finger tight, but to avoid damaging the screws or the rings, do not over-tighten the locking screws and do not use an Allen key.

10. Carefully replace the IP65 lens cover back onto the lens, ensuring that it's fully clipped into place. To do this:
 - a. Hook one side of the clips on the cover, then rotate the other side on, with your thumb overhanging the clip area for extra leverage.
 - b. Supporting the underside of the lens, push firmly downward over the clip until it clicks into place.
 - c. Check both clips are in place and the cover is correctly positioned over the lens.

⚠ Caution

To ensure the lens remains free from dirt and other contaminants and that the camera remains IP65-rated, keep the lens cover in position over the lens after installation.

11. Return the Vicon software to the default capture settings (for details, see the documentation for your Vicon application software).

⚠ Caution

If the lens cover and IP65 cable cap are not fitted or are incorrectly fitted, the Valkyrie camera ceases to be IP65-rated. To maintain IP65 protection for your Vicon Valkyrie cameras, ensure that if you remove IP65 cable caps (and/or lens covers), you replace them correctly, as described in Remove and replace IP65 cable cap in the *Vicon Valkyrie Quick Start Guide*.

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Vicon Valkyrie status lights and TFT LCD display

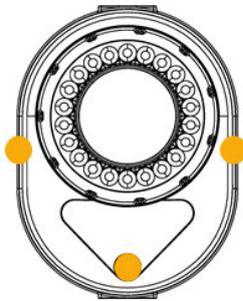
The following topics describe the status lights, which provide feedback on camera operation, and the Valkyrie TFT LCD (thin film transistor liquid crystal display) on the front of the camera, which provides more detailed information about the current status of the camera.

- [Valkyrie status lights, page 37](#)
- [Valkyrie camera display, page 39](#)

Valkyrie status lights

Three tri-color LEDs provide feedback on camera operation. One pair is situated on either side of the camera, and the third is situated towards the bottom on the front. All three LEDs operate simultaneously, and display the same color at the same time. These status LEDs can be deactivated through the Vicon application software.

Note
In certain camera modes and in certain system configurations, the status LEDs on the camera are automatically turned off to ensure maximum power is available to the strobe.



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While the camera is booting, the Valkyrie display shows the Valkyrie logo (unless a connected application causes it to display something else) and the status LED color changes from gold to blue when it connects to the Vicon application software. (If no Vicon application software is currently running, it remains gold.)



When the camera is communicating with Vicon application software, the status LEDs turn blue and the Valkyrie display shows the camera number.

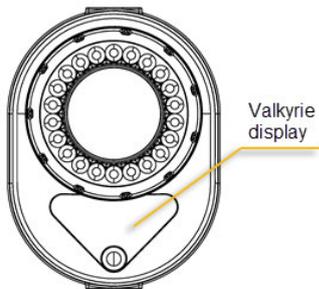
If the camera is communicating with the Vicon application software, but the software is incompatible, the status LEDs turn blue, but the Valkyrie display continues to show the Valkyrie logo.

While the camera firmware is updating, the status LEDs turn green. After rebooting, they return to blue, as normal.

After the camera has booted, you can view its status by observing the status LEDs and the Valkyrie display), and also by monitoring the camera in the Vicon application software. For information on the significance of the status LEDs' colors in combination with the symbols on the Valkyrie display, see [Valkyrie camera display, page 39](#).

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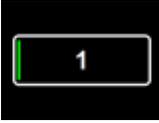
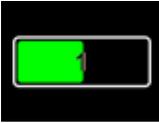
Valkyrie camera display



The Valkyrie display comprises 320 x 240 pixels (x 18-bit RGB), which, combined with the LED color, gives information about the current camera status.

As shown in the following table, when the camera has booted, and unless the display has been deactivated in the Vicon application software, the display shows the camera number. Other common display states are also shown.

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Display	Description	Camera status
	Valkyrie logo	Booting
	Camera number	Booted
	Camera number and deactivated icon	Inactive
	Camera number and start calibration progress bar (visible on the left)	Calibration started
	Camera number and progress bar	Calibration in progress
	Camera number and complete progress bar	Calibration complete
	Display turned off in Vicon application software	NA

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Additional information is available when you view the camera display in combination with the color of the status LEDs. (Note that the status LED colors listed below are subject to change.)

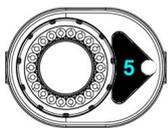
Display	Status LED color	Status
	Gold	Booting, not yet connected
	Blue	Enabled (default)
	Red	Not contributing
	Red (flashing)	Hardware fault/firmware issue
	Blue (flashing)	Bumped
	Off	Deactivated
	Magenta	Selected

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Display	Status LED color	Status
	Off	Calibration (Wand count == 0) (The start calibration progress bar indicates that calibration has started.)
	Magenta (flashing, period decreases with wand count)	Calibration ($0 < \text{Wand count} < \text{Required calibration frames}$) The progress bar indicates the fraction of the required calibration frames that have been received from this camera.
	Green	Calibration ($\text{Wand count} \geq \text{Required calibration frames}$)
	Cyan	Automasking
	Off	Status LEDs turned off

The order of priority is from top of the above table (lowest) to bottom (highest), so that the LEDs for a camera that is both bumped and selected are magenta.

Unless accelerometry is switched off in the Vicon application software, the image on the display rotates based on the orientation of the camera. (However, note that the Valkyrie logo does not rotate to 90° when the camera is rotated.)



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Vicon Valkyrie system cables

The following topics describe the cables used to connect hardware components in a Vicon Valkyrie system.

- [About Vicon Valkyrie cables in a Valkyrie system, page 44](#)
- [Vicon Valkyrie system cable descriptions, page 46](#)

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About Vicon Valkyrie cables in a Valkyrie system

Cables are supplied with Vicon Valkyrie systems to connect Valkyrie hardware components. Most of these are network cables, which carry the power, all the communication data, and synchronization.



Important

Where Ethernet cable is required to connect cameras, we recommend using Vicon-supplied cable.

For details of the cables supplied with your Vicon Valkyrie system, see the bill of materials accompanying your product shipment. If any cables are missing on receipt, or if you require additional cables later, please contact Vicon or your nearest agent or distributor.

Note the following cable requirements for Valkyrie systems. For more information about any of the components, contact [Vicon Support](#)¹⁷.

- Valkyrie cameras are connected to an Ethernet switch (usually PoE++), with cables of a minimum type of Category 6 (Cat 6).
 - Vicon-supplied Ethernet cable for Valkyrie cameras are equipped with an IP65 cable cap and seal, which, when correctly fitted to each camera, ensure that the connection is IP65-rated.
 - If you use Cat 6 Ethernet cable that is not supplied by Vicon, to achieve IP65 protection for your Valkyrie cameras, you must fit an IP65 cable cap and seal (obtained from Vicon) to the cable and correctly fit the cable to the Ethernet port on the camera.
For instructions, see 'Add IP65 protection to Ethernet cable' and 'Remove and replace IP65 cable cap' in the *Vicon Valkyrie Quick Start Guide*.
- Other Vicon network cables with RJ45 connectors (eg, Lock to switch) are Cat 6 (minimum) cable type, without an IP65 cable cap.



Caution: To ensure Valkyrie cameras remain IP65-rated, if you remove the IP65 cable cap that protects the connection between the Ethernet cable and the camera, always replace it correctly. For instructions, see Remove and replace IP65 cable cap in the *Vicon Valkyrie Quick Start Guide*.

¹⁷ <mailto:support@vicon.com>

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The following additional cables and accessories may also be supplied, depending on your system topology:

System component	Cables required
SFP+ switch	Direct Attach Cables and, if required, SFP+-to-Ethernet transceivers
Connections between SFP+ ports	10 Gb SFP+ Direct Attach Cables
Connections between SFP+ and RJ45 Ethernet ports	SFP+ to Ethernet transceivers Note that a Lock power switch must be connected via an SFP-10G-T-PLU transceiver
Supported FLIR cameras	Vicon sync cable (to connect a Lock to the FLIR camera) and FLIR 5 m USB 3.1 locking cable (to connect the camera to the PC)
Vicon Lock Lab	Eight Weidmüller connectors to connect the Lock to third-party analog capture devices
Two Lock units	Lock-to-Lock Link cable

Depending on your Valkyrie system components, you may also require commercially available cables to connect a Lock to third-party devices.

Such cables may be:

- Created by you:
 - To connect the provided Weidmüller connectors to the analog source connector
 - For remote triggering devices
- Obtained from video specialist distributors (such as for timecode, video devices such as broadcast and VESA Stereo video)

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Vicon Valkyrie system cable descriptions

The following topics describe the cables you need for various types of Vicon Valkyrie system.

- [Basic Vicon Valkyrie system cables, page 47](#)
- [Extended Vicon Valkyrie system cables, page 49](#)
- [Mixed Vicon Valkyrie system cables, page 54](#)

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Basic Vicon Valkyrie system cables

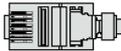
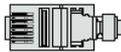
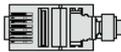
The following tables list the cables that are used in a basic Vicon Valkyrie system for up to eight Valkyrie cameras. For details of this type of system, see [Set up a basic Vicon Valkyrie system, page 56](#).

- [Vicon Valkyrie camera to Ethernet switch cable, page 47](#)
- [Vicon Valkyrie host PC to Ethernet switch cable, page 48](#)

You can use the following information to identify the correct cables and connection points to use when setting up your Valkyrie system.

Vicon Valkyrie camera to Ethernet switch cable

Use this cable with the supplied cap and seal to connect a Valkyrie camera to a PoE++ switch.

Cable name	Valkyrie camera end	Switch end	Description
Valkyrie Cable Ethernet Cap-ASY (30 m and 50 m)	 8-pin RJ45 plug	 8-pin RJ45 plug	A Vicon-supplied RJ45 Standard 1000Base-T Gigabit Ethernet network cable (Cat 6), fitted with a cap and seal for IP65 rating
Valkyrie Cat 6 Ethernet Cable (30 m and 50 m)	 8-pin RJ45 plug	 8-pin RJ45 plug	RJ45 Standard 1000Base-T Gigabit Ethernet network cable (requires Vicon-supplied cap and seal for IP65 rating)
Valkyrie Cable Ethernet Seal and Cover	NA	NA	A Vicon-supplied cap and seal which, when correctly fitted to a Cat 6 shielded Ethernet cable, ensures the IP65 protection of the Ethernet port on a Valkyrie camera

Vicon Valkyrie cameras and connections
 \ Vicon Valkyrie system cables\

Vicon Valkyrie host PC to Ethernet switch cable

Use this cable to connect a host PC to a PoE++ switch.

Cable name	Host PC end	Switch end	Description
Cat 6 Ethernet cable (5 m)	 8-pin RJ45 plug	 8-pin RJ45 plug	RJ45 Standard 1000Base-T Gigabit Ethernet network cable (Cat 6).

Vicon Valkyrie cameras and connections
 \ Vicon Valkyrie system cables \

Extended Vicon Valkyrie system cables

The following tables list the cables, which are used in the types of systems described in [Extend a basic Valkyrie system, page 61](#), including adding a Vicon Lock.

- [Vicon Lock to Lock power switch cable, page 50](#)
- [Power switch to data switch cable, page 50](#)
- [Lock power switch to data switch cable, page 51](#)
- [Vicon Lock to third-party devices cables, page 51](#)
- [Lock to Lock cable, page 53](#)

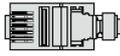
You can use this information to identify the correct cables and connection points to use when setting up your Valkyrie system to include third-party devices such as analog capture devices, synchronized output devices, remote triggering devices, and genlock/timecode video devices.

For information on the types of switches required for Valkyrie systems, see [Switches in Valkyrie systems, page 65](#).

Vicon Valkyrie cameras and connections
 \ Vicon Valkyrie system cables\

Vicon Lock to Lock power switch cable

Use this cable to connect a Lock to a PoE++ or SFP+* (simple switch, power switch or data switch*) or PoE+ switch (Lock power switch).

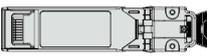
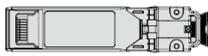
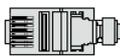
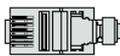
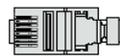
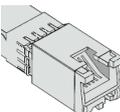
Cable name	Vicon Lock end	Switch end	Description
Lock to PoE++ Cat 6 Ethernet cable (5m)	 8-pin RJ45 plug	 8-pin RJ45 plug	Shielded RJ45 Standard 1000Base-T Gigabit Ethernet network cable (Cat 6)

* If you connect a Lock via the Lock power switch to a data switch, an SFP-10G-T-PLU SFP+ transceiver is also required: see [Lock power switch to data switch cable, page 51](#).

Power switch to data switch cable

Use these cables (with transceivers where necessary) to connect a power switch to a data switch or to connect two data switches (SFP+ to SFP+).

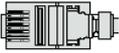
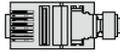
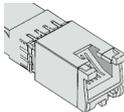
If your system requires a longer length (50 m) cable to connect the power switch to the data switch, a 50m Ethernet cable with two SFP+ transceivers is required.

Cable name	Power switch end	Data switch end	Description
3m passive SFP+ Direct Attach Cable	 SFP+ plug	 SFP+ plug	3m passive SFP+ Direct Attach Cable
Ethernet extension cable (50m)	 8-pin RJ45 plug	 8-pin RJ45 plug	50m Cat6 (minimum) Ethernet cable with RJ45 connectors
SFP+ extension cable (50m)	 8-pin RJ45 plug	 8-pin RJ45 plug	50m Cat6 (minimum) Ethernet cable with RJ45 connectors, with 2 x SFP+ to Ethernet transceivers (see next line item)
SFP+ Transceiver	 RJ45 socket	 SFP+ plug	SFP+ transceiver, converts SFP+ ports to copper 10GBase-T up to 80 meters

Vicon Valkyrie cameras and connections
 \ Vicon Valkyrie system cables \

Lock power switch to data switch cable

Use this cable and transceiver to connect a Lock power switch to a data switch (Ethernet to SFP+).

Cable name	Lock switch end	Data switch end	Description
Lock switch to data switch cable Cat 6 Ethernet cable (5m)	 8-pin RJ45 plug	 8-pin RJ45 plug with transceiver	Shielded RJ45 Standard 1000Base-T Gigabit Ethernet network cable (Cat 6)
SFP-10G-T-PLU SFP+ Transceiver	 RJ45 socket	 SFP+ plug	SFP+ 10G transceiver, converts SFP+ ports to copper 10GBase-T (RJ45) up to 30 meters

Vicon Lock to third-party devices cables

Use these cables to connect a Vicon Lock to third-party devices.

Cable name	Vicon Lock end	Third-party device	Description
OMNIMATE Signal connector (3.5mm) cable for these amplifiers: <ul style="list-style-type: none"> • AMTI Gen5, MSA-6 and OPT-SC • Kistler 9865B • Kistler 5233A2 • Bertec 	 Weidmüller connector (plugs into Analog Input (8 channels x8)	 Device dependent	Enables cables to connect to the 64 channels of analog capture. Each connector allows for eight connections to eight analog sources with their associated grounds. A force plate can connect through one connector. See also Add analog capture devices to a Vicon system in the <i>Vicon Systems Setup Guide</i> .
Phono (RCA) cable (plus device-dependent plug)	 RCA phono plug (plugs into Sync Out (GPO) x8)	 Device dependent	Enables connection to third- party devices that require synchronization or triggering.

Vicon Valkyrie cameras and connections
 \ Vicon Valkyrie system cables\

Cable name	Vicon Lock end	Third-party device	Description
Phono (RCA) cable (plus device-dependent plug)	 <p>RCA phono plug (plugs into Remote Control In Start and Stop x2)</p>	 <p>Device dependent</p>	Enables connection to third-party devices that can trigger (start and stop) capture.
BNC cable	 <p>BNC – 75 Ω (ohm) (plugs into Broadcast Sync (VITC) In)</p>	 <p>BNC – 75 Ω (ohm)</p>	Enables connection to an external analog video source for genlocking to. Analog SD bi-sync video may also carry VITC timecode in.
Male to Female XLR cable	 <p>XLR plug (male) (plugs into LTC (Timecode) balanced In)</p>	 <p>XLR plug (female)</p>	Enables the connection of balanced LTC – In. Note that for correct operation, a synchronized video signal must accompany this signal.
VESA Stereo In cable Manufacturer: CUI Inc Digi-Key part no: MD-30 CP-2030-ND VESA standard IEC10764105 stereoscopic connection type	 <p>3-pin mini-DIN (plugs into VESA Sync In)</p>	 <p>Device dependent</p>	Enables the connection of VESA Stereo devices for genlocking.

Vicon Valkyrie cameras and connections
 \ Vicon Valkyrie system cables \

Lock to Lock cable

If you want to use an additional Vicon Lock in your Vicon Valkyrie system, use this cable to connect a Lock to a second Lock:

Cable name / part no.	Vicon Lock end	Vicon Lock end	Description
Lock-to-Lock synchronizing cable	 <p>3-pin plug (plugs into Link Input/Output)</p>	 <p>3-pin plug (plugs into Link Input/Output)</p>	<p>Proprietary cable for synchronizing an additional Lock. Mini cord connector with 3 male contacts.</p>

Vicon Valkyrie cameras and connections
 \ Vicon Valkyrie system cables\

Mixed Vicon Valkyrie system cables

The following tables describes the cables (additional to those listed in [Basic Vicon Valkyrie system cables, page 47](#)) for connecting hardware components in a mixed Valkyrie system that includes older Vicon cameras (Vantage, Vero or Viper) as well as Valkyrie cameras. Use this information to identify the correct cables and connection points to use when setting up a mixed Valkyrie system.

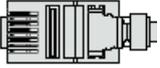
Note that these topics do not describe all the cables supplied with Vantage systems; it is assumed that any Vantage system cameras and switches are already connected with the originally supplied cables. For descriptions and uses of Vantage cables, see the documentation for your Vicon Vantage system.

- [Vicon Lock to Ethernet switch cable, page 54](#)
- [Lock power switch to data switch cable, page 54](#)

For details of this type of system, see [Set up a mixed Valkyrie system with Vantage or Vero cameras, page 78](#).

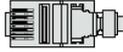
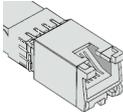
Vicon Lock to Ethernet switch cable

Use this cable to connect a Lock to a PoE++ or PoE+ switch.

Cable name	Vicon Lock end	Switch end	Description
Lock to PoE++ RJ45 cable (Cat 6) 5m	 8-pin RJ45 plug (plugs into PoE socket)	 8-pin RJ45 plug	A Vicon-supplied, shielded RJ45 Standard 1000Base-T Gigabit Ethernet network cable, Cat 6 (minimum)

Lock power switch to data switch cable

If your mixed system includes a data switch and a Lock, use this this cable and transceiver to connect the Lock power switch to the data switch (Ethernet to SFP+).

Cable name	Lock switch end	Data switch end	Description
Lock switch to data switch cable Cat 6 Ethernet cable (5m)	 8-pin RJ45 plug	 8-pin RJ45 plug with transceiver	Shielded RJ45 Standard 1000Base-T Gigabit Ethernet network cable, Cat 6 (minimum)
SFP-10G-T-PLU SFP+ Transceiver	 RJ45 socket	 SFP+ plug	SFP+ 10G transceiver, converts SFP+ ports to copper 10GBase-T (RJ45) up to 30 meters

Build a Vicon Valkyrie system

Build a Vicon Valkyrie system

The following topics explain how to build a basic Vicon Valkyrie system, and then extend this basic system to add a Vicon Lock, supported FLIR cameras, and other third-party devices.

- [Set up a basic Vicon Valkyrie system, page 56](#)
- [Extend a basic Valkyrie system, page 61](#)
- [Set up a mixed Valkyrie system with Vantage or Vero cameras, page 78](#)



Note

The system configurations in this section were current at the time of publication, but may now have been superseded. For up-to-date information, visit the [Valkyrie system diagrams](#)¹⁸ page and the [PC specifications](#)¹⁹ page on the Vicon website or contact [Vicon Support](mailto:support@vicon.com)²⁰.

¹⁸ <https://docs.vicon.com/display/Connect/Valkyrie+system+diagrams>

¹⁹ <https://www.vicon.com/support/faqs/?q=what-are-the-latest-pc-specifications>

²⁰ <mailto:support@vicon.com>

Build a Vicon Valkyrie system
 \ Set up a basic Vicon Valkyrie system\

Set up a basic Vicon Valkyrie system

The following topics describe how to put together a Vicon Valkyrie system that consists of the minimum components needed for a basic setup.

- [Basic Vicon Valkyrie system topology, page 57](#)
- [Put together the Vicon Valkyrie hardware, page 58](#)
- [Set up the software, page 60](#)

In addition to setting up a basic Vicon system with Valkyrie cameras, an Ethernet (PoE++) switch and a Vicon Valkyrie host PC, if required you can:

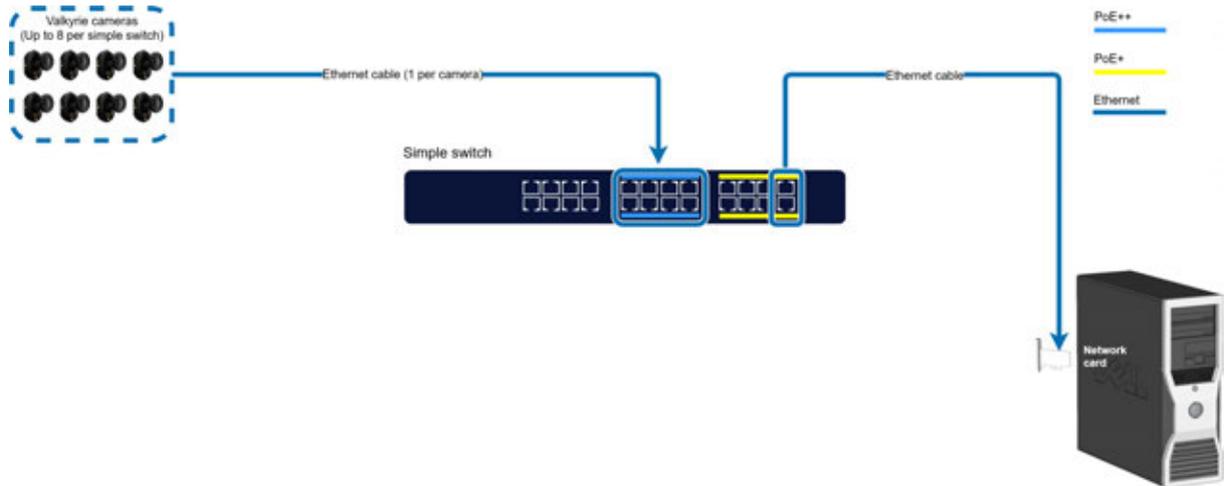
- Extend the system to include additional Valkyrie cameras with further switches; add a Vicon Lock to include supported third-party devices such as supported FLIR cameras, analog capture devices, synchronized output devices, remote triggering devices, genlock/timecode video devices, and VESA Stereo video devices (see [Extend a basic Valkyrie system, page 61](#)). For more information on these types of devices, see the *Vicon Systems Setup Guide* or the relevant Lock guide.
- Use older Vicon cameras (Vantage, Vero or Viper) cameras with Valkyrie cameras in a mixed system. For details of the Vicon components and third-party devices that you can use with Vicon Valkyrie cameras, see [Set up a mixed Valkyrie system with Vantage or Vero cameras, page 78](#).

Build a Vicon Valkyrie system

\ Set up a basic Vicon Valkyrie system \

Basic Vicon Valkyrie system topology

A basic Vicon Valkyrie system consists of a primary Ethernet (PoE++) switch, up to eight Valkyrie cameras, and a Vicon Valkyrie host PC, as shown in the following illustration.



For details of the components of this basic system, see [Vicon Valkyrie system components, page 6](#).

The Ethernet switch provides power and data communication for the Valkyrie cameras. It also routes the Vicon sync (Ethernet synchronization and time stamp) from the sync source camera (selectable in your Vicon application software) to all connected secondary cameras. In addition, the Ethernet switch manages the data flow to the Vicon Valkyrie host PC. This PC runs the Vicon software that you use to process, visualize, and analyze your data.

For instructions on setting up a basic Valkyrie system, see:

- [Put together the Vicon Valkyrie hardware, page 58](#)
- [Set up the software, page 60](#)

Build a Vicon Valkyrie system
 \ Set up a basic Vicon Valkyrie system\

Put together the Vicon Valkyrie hardware

The first step in putting together a Vicon Valkyrie system is to set up your hardware. Gather the hardware components, the downloaded Vicon application software installer, and the documentation. For details of the components supplied with your particular system, see the Bill of Materials that accompanied the shipment.

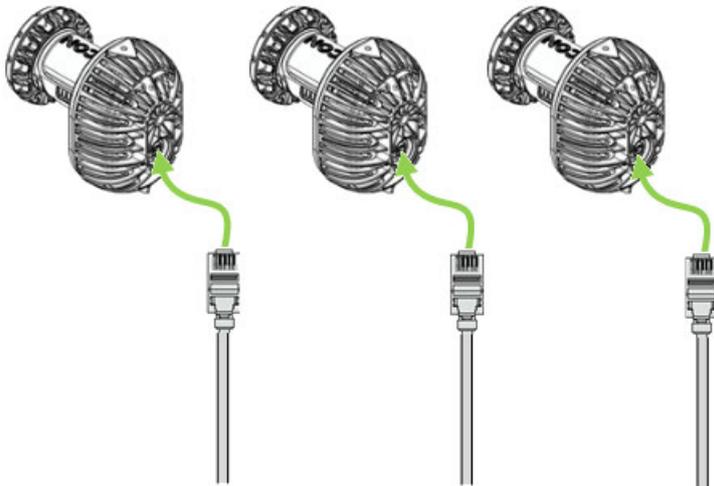
Assemble and connect the Valkyrie hardware components:

1. For each Valkyrie camera, assemble the head block and connect the camera and base plate to it.
2. Mount the Valkyrie camera and head block assemblies on tripods or on a clamp and truss on a speed rail, and then position them around the capture volume.
3. For each Valkyrie camera, plug one end of a Vicon-supplied Cat 6 RJ45 Ethernet cable into one of the available RJ45 sockets in the Ethernet switch.

If your Ethernet switch is a PoE++ with both PoE++ and PoE+ sockets, to take full advantage of the power of the switch, ensure all the Valkyrie cameras are plugged into PoE++ sockets.

From the total number of sockets, remember that:

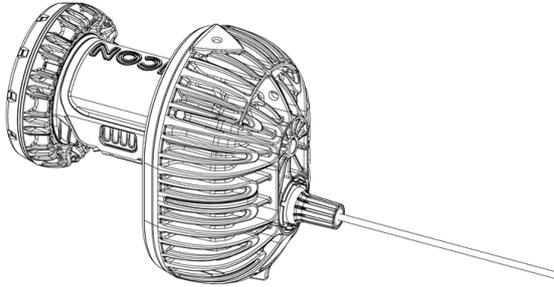
- One socket is required to connect to the Vicon Valkyrie host PC, which can be connected to one of the uplink ports.
 - The Ethernet (PoE++) ports on a PoE++ switch can support up to 8 Valkyrie cameras. Any remaining powered ports can support other components required in your system, such as an additional switch or a Vicon Lock.
4. Plug the other end of the Ethernet cable into the RJ45 socket on the rear of each Valkyrie camera.



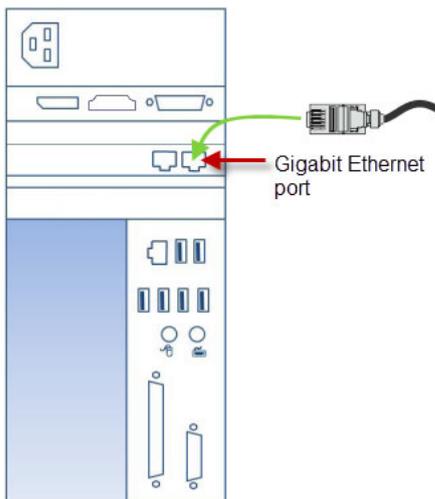
⚠ Caution: To ensure Valkyrie cameras remain IP65-rated, if you remove the IP65 cable cap that protects the connection between the Ethernet cable and the camera, always replace it correctly. For instructions, see Remove and replace IP65 cable cap in the *Vicon Valkyrie Quick Start Guide*.

Build a Vicon Valkyrie system

\ Set up a basic Vicon Valkyrie system \



5. Plug one end of the host PC cable into one of the uplink sockets in the Ethernet switch.
6. Plug the other end of the cable into the appropriate PCIe network Gigabit Ethernet port for the Valkyrie system network on the rear of the host PC (for details, see Vicon system network ports in the *Vicon Systems Setup Guide*).



For details of the Vicon host PC cable, see [Vicon Valkyrie system cable descriptions, page 46](#).

7. Switch on the host PC, and allow it to boot up.
8. Switch on the Ethernet switch.

Build a Vicon Valkyrie system
 \ Set up a basic Vicon Valkyrie system\

Set up the software

After you have put together the Vicon Valkyrie hardware, you install, configure, and start your Vicon application software.



Note

If you bought your Vicon Valkyrie host PC from Vicon, the software is installed. You do not need to install it again. You can check that the Vicon software folders and icons have been added to the standard locations on the Windows desktop or Start menu.

To set up the software:

1. Run the downloaded Vicon application software installer.
After your Vicon application software has been installed, program folders and icons are added to the standard Windows locations, according to the installation options you selected.
2. Activate the software license. For information on how to do this, see the installation and licensing instructions supplied with your Vicon application software.
3. On the Vicon Valkyrie host PC, configure the Vicon Valkyrie system IP address:
 - IP address: 192.168.10.1
 - Subnet mask: 255.255.255.0
 - Default gateway: Leave blankFor detailed instructions on configuring your PC network card, including how to change the Jumbo Packet setting to its maximum value and other necessary steps, see [Configuring network card settings on the Vicon website](#). If you are setting up dual network ports on your Vicon Valkyrie host PC (recommended if your system includes Vicon video cameras), see also [Vicon host PC connectors in the Vicon Systems Setup Guide](#).
4. Start the Vicon application software.
The application software splash screen is displayed.
5. To start real-time streaming of data from the Valkyrie cameras, connect the Vicon application software to the Valkyrie system:
 - **Shogun Live, Tracker 4 and Evoke:** In the **System** panel, go to the **Vicon Cameras** section and check that the cameras are connected (indicated by a cyan icon if not yet calibrated) and at the bottom of the **Workspace**, the displayed information (eg, Frames, Seconds) is updating.
 - **Nexus and Tracker 3:** In the **Resources** pane, click the **Go Live** button. When the system is connected, the button label changes to **Go Offline** and the camera icon changes color.

For information on using your Vicon application software, see the links in the software Help menu or visit docs.vicon.com²¹.

²¹ <https://docs.vicon.com>

Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system \

Extend a basic Valkyrie system

The following topics explain how to connect additional Ethernet switches to scale your Vicon Valkyrie system to add Vicon Lock units, Valkyrie cameras, and supported FLIR cameras to the basic system described in [Set up a basic Vicon Valkyrie system, page 56](#).

- [Add a Vicon Lock to a basic Valkyrie system, page 62](#)
- [Understand when additional switches are required, page 64](#)
- [Add supported FLIR cameras to a Vicon Valkyrie system, page 67](#)
- [Example Vicon Valkyrie systems, page 71](#)

For further examples of different types of Vicon Valkyrie systems, see [Valkyrie system diagrams](#)²².

²² <https://docs.vicon.com/display/Connect/Valkyrie+system+diagrams>

Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system\

Add a Vicon Lock to a basic Valkyrie system

When a Vicon Lock is added to a basic Valkyrie system (see the following diagram), it enables interfacing and synchronization to third-party devices.

Lock Studio and Lock Lab offer different features to suit a variety of applications. For more information on Vicon Locks, see the relevant Lock guide (PDF) or Vicon Lock connectivity units in the *Vicon Systems Setup Guide*.

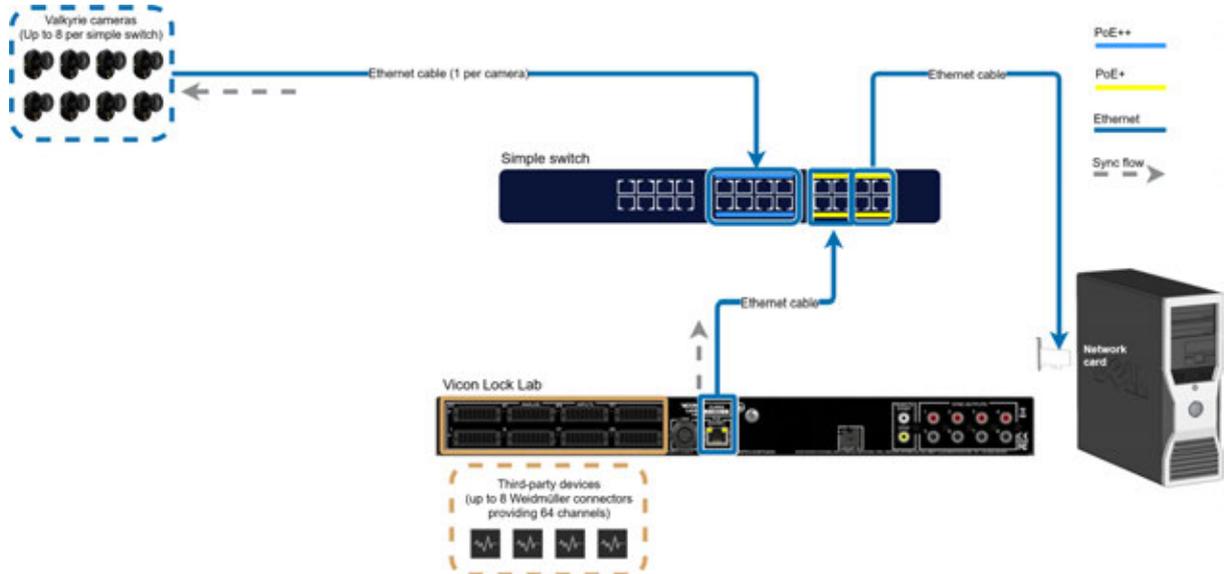
When adding a Lock to a Vicon Valkyrie system, bear in mind the following points:

- One simple switch can support up to eight Valkyrie cameras in your system. For an explanation of the types of switches that can be included in a Valkyrie system, see [Ethernet switches in Valkyrie systems, page 65](#).
- One uplink port can be used to connect to the host PC. The Ethernet switch that is connected to the host PC is known as the primary switch.
- The remaining ports can be used to connect a Vicon Lock, and/or one or more Vicon optical cameras, Note that a Lock (which may be connected directly or via a Lock switch, depending on your system requirements) or a Vicon optical camera takes up one port of the switch.
- If you want to use more than eight Valkyrie cameras, and/or the number of additional devices (such as Lock, etc) require more ports or more power than is provided by the primary Ethernet switch, you must add a second Ethernet switch to your system. If you're not sure if the power requirements of your devices will be met by a simple switch, see [Understand when additional switches are required, page 64](#) or contact [Vicon Support](#)²³ for advice.
- In a system that contains multiple Ethernet switches, the sync source must be a camera or a Lock that is connected to the primary Ethernet switch (ie, the switch that is connected to the PC).

²³ <mailto:support@vicon.com>

Build a Vicon Valkyrie system \ Extend a basic Valkyrie system \

This diagram shows an example of a basic Valkyrie system with a Lock Lab to connect third-party analog devices.



Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system\

Understand when additional switches are required

To benefit from the power and range of Vicon Valkyrie cameras, connect each Valkyrie camera to a PoE++ port of an Ethernet (PoE++) switch. If your motion capture application requires more than eight Vicon Valkyrie cameras, you must add one or more additional PoE++ switches.

A Vicon Valkyrie camera, Lock unit, and the Vicon Valkyrie host PC each connect to one port on a switch. The connection to the Valkyrie host PC carries all the control data as well as all the motion capture data from the cameras.

Video data can be routed separately. For information on how to correctly route video data through an Ethernet switch, see the *Vicon Systems Setup Guide*. Note that the ports connected to host PC ports do not draw any power.

Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system \

Switches in Valkyrie systems

The following types of switches may be included in Valkyrie systems.

- **Simple switch** A simple switch can provide up to 8 PoE++ connections for Valkyrie cameras, and PoE connections for a Lock and a PC. For an example of this type of system, see [Set up a basic Vicon Valkyrie system, page 56](#) and [Add a Vicon Lock to a basic Valkyrie system, page 62](#).
- **Power switch** A power switch can provide up to 8 PoE++ connections for Valkyrie cameras, and also connect to another switch through an SFP+ port to enable you to expand your system to up to 80 Valkyrie cameras. For an example of this type of system see [Vicon Valkyrie system with up to 80 cameras and a Lock, page 74](#).
- **Data switch** A data switch can provide up to 16 SFP+ ports for connecting to other switches. However, the SFP+ connection can only carry enough data for up to 80 Valkyrie cameras, so only up to 10 power switches can connect to a data switch, enabling you to expand your system to up to 160 Valkyrie cameras with two data switches. For examples of these types of systems see [Vicon Valkyrie system with up to 80 cameras and a Lock, page 74](#) and to see how to add further cameras, see [Vicon Valkyrie system with up to 160 cameras and a Lock, page 75](#).
- **Lock power switch** Use a Lock switch when a Vicon Lock needs its own PoE power source. For an example of this type of system see [Vicon Valkyrie system with up to 80 cameras and a Lock, page 74](#).

This table shows the number of switches required to support various example systems.

Valkyrie	Lock	Lock switch	FLIR camera	Simple switch	Power switch	Data switch	See
1-8	0	0	0	1	0	0	Set up a basic Vicon Valkyrie system, page 56
1-8	1	0	0	1	0	0	Add a Vicon Lock to a basic Valkyrie system, page 62
1-8	1	0	1	0	1	0	Add supported FLIR cameras to a Vicon Valkyrie system, page 67
9-80	1	1	0	0	1-10	1	Vicon Valkyrie system with up to 80 cameras and a Lock, page 74
81-160	1	1	0	0	11-20	2	Vicon Valkyrie system with up to 160 cameras and a Lock, page 75

Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system\

For further information on the requirements of different configurations, see the [Valkyrie system diagrams](#)²⁴.

For information on setting up a mixed system that includes older Vicon cameras (Vantage, Vero or Viper) and Vicon Valkyrie cameras, see [Set up a mixed Valkyrie system with Vantage or Vero cameras, page 78](#).

²⁴ <https://docs.vicon.com/display/Connect/Valkyrie+system+diagrams>

Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system \

Add supported FLIR cameras to a Vicon Valkyrie system

The following topics describe how to set up the hardware for a Valkyrie system that includes Teledyne FLIR BLackfly S cameras:

- [Attach cables to the FLIR camera, page 68](#)
- [Install USB 3.0 expansion card, page 69](#)
- [Attach the mounting plate to the camera, page 69](#)
- [Attach the lens to the camera, page 69](#)
- [Connect the camera to the PC, page 69](#)
- [Connect the camera to the Lock, page 70](#)
- [Position and aim the camera, page 70](#)

For more detailed instructions and hardware recommendations, see the *FLIR Cameras Setup Guide* for your Vicon application software.

For information about the necessary software setup, see the FLIR camera setup steps in the documentation for your Vicon application software.

Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system \

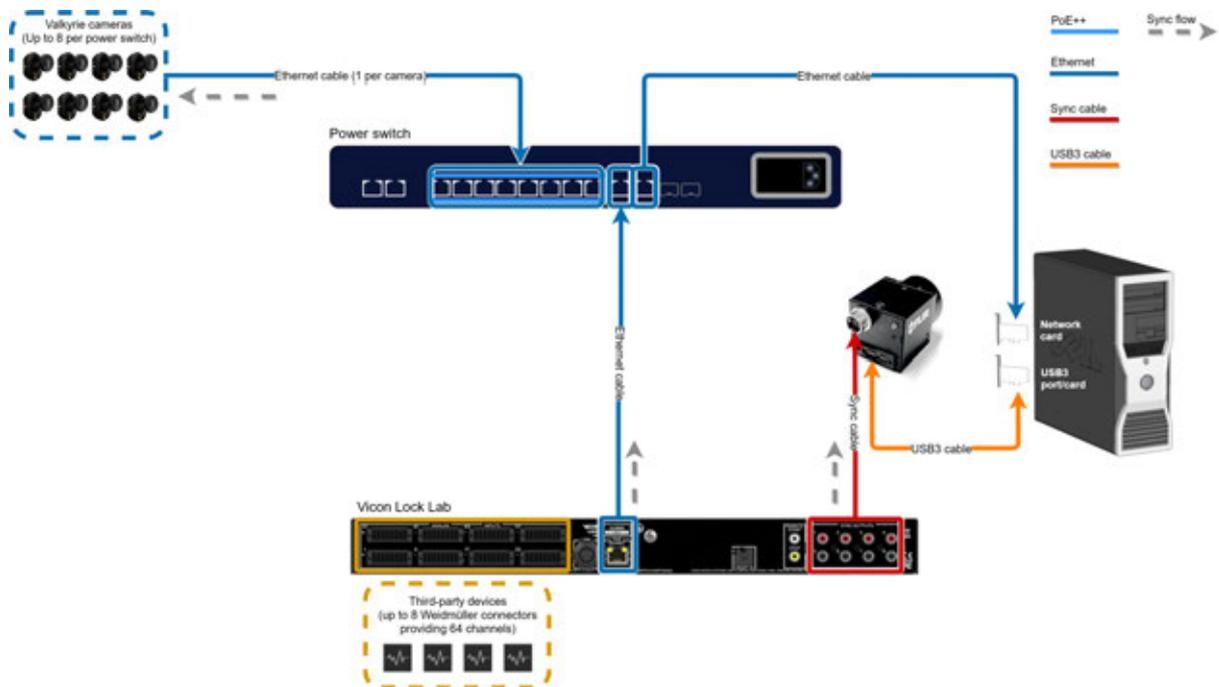
Attach cables to the FLIR camera

Attach two cables to each camera:

- Attach a USB3 cable that will connect to the PC for power, control and data.
- Attach a sync cable that will connect to a Vicon Lock for synchronization.

We recommend initially setting the camera up close to the PC and Lock to verify correct functioning, using the 5 m cables, before introducing any extension cables. Extension cables can cause issues with bandwidth and power, so add these after the camera is set up and functioning satisfactorily.

This diagram shows a setup for a single FLIR camera:



Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system \

Install USB 3.0 expansion card

The latest Vicon PCs come equipped with a FLIR USB3 card. For other PCs, an expansion card is required if:

- The onboard ports on the PC are not sufficiently fast.
- The PC doesn't have enough onboard ports.
- The system includes more than two USB 3.0 cameras.

Install the card in a spare PCIe slot, remembering to connect its external power to either a SATA or Molex drive power connector.



Latest drivers

Before you proceed, download and install the latest drivers for the expansion card from the manufacturer's website.

Attach the mounting plate to the camera

Carefully attach the mounting plate to the underneath of the camera with the four small bolts included, taking care not to lose them or overtighten them.

Attach the lens to the camera

Attach a suitable C-mount lens for the camera.

Connect the camera to the PC

1. Connect the USB3 cable from the camera to the PC.
2. Ensure that the screws are tightened up on the camera side to lock the cable in place and that the connector is not subject to excessive force, eg, from the weight of cables or because it is in a position where it could be knocked.

To avoid the whole weight being borne by the camera's connector, we recommend that you attach the cables to the tripod or rig with cable ties.

Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system\

Connect the camera to the Lock

Connect the sync cable from the camera to the Vicon Lock unit. To do this:

1. Rotate the camera end of the cable, which is keyed, until the correct alignment is found.
The cable end clicks into place.
2. Attach the other end to the Lock unit.
It uses an RCA phono connection, which plugs into the Lock's GPO port.
3. Make a note of the GPO port that the cable is connected to. You will need this during software setup as it is not detected automatically.



Note

No video is displayed in your Vicon application software until the sync cable is correctly connected to a Vicon Lock unit and the Lock is configured in the software.

Position and aim the camera

1. Attach the mounting plate to the tripod head or clamp on the rig.
2. Aim the camera in approximately the desired direction. You can change the exact direction later, when software setup is complete and video is being streamed to your Vicon application software. Ensure you finalize the aim before calibrating.

Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system \

Example Vicon Valkyrie systems

The following topics give examples of various Vicon Valkyrie systems, from a basic system to a system where legacy components are combined with Valkyrie components.

- [Basic Valkyrie system \(up to 8 Valkyrie cameras\), page 72](#)
- [Basic Valkyrie system with a Vicon Lock, page 73](#)
- [Vicon Valkyrie system with up to 80 cameras and a Lock, page 74](#)
- [Vicon Valkyrie system with up to 160 cameras and a Lock, page 75](#)
- [Valkyrie system with a Vicon Lock and FLIR camera, page 76](#)
- [Mixed Vicon Valkyrie system \(with Vantage\), page 77](#)



Note

The above system configurations were current at the time of publication, but may now have been superseded. For up-to-date information or further guidance, visit the [Valkyrie system diagrams](#)²⁵ page and the [PC specifications](#)²⁶ page on the Vicon website or contact [Vicon Support](#)²⁷.

²⁵ <https://docs.vicon.com/display/Connect/Valkyrie+system+diagrams>

²⁶ <https://www.vicon.com/support/faqs/?q=what-are-the-latest-pc-specifications>

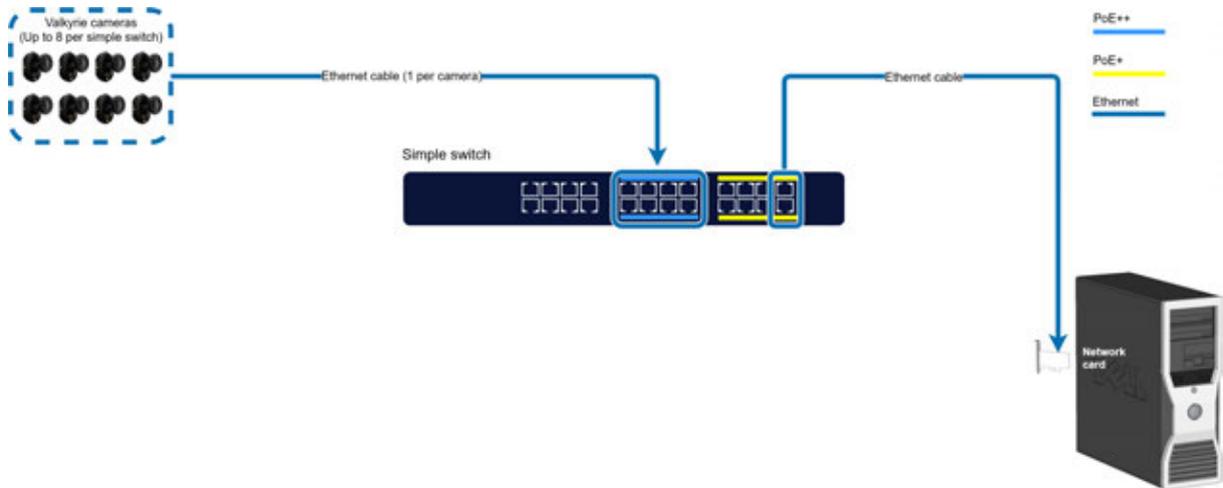
²⁷ <mailto:support@vicon.com>

Build a Vicon Valkyrie system \ Extend a basic Valkyrie system\

Basic Valkyrie system (up to 8 Valkyrie cameras)

The simplest Vicon Valkyrie system consists of between 1–8 Valkyrie cameras, an Ethernet switch (normally PoE++), and a host PC (for descriptions of these components, see [Vicon Valkyrie system components, page 6](#)).

This diagram shows an example of a basic system.



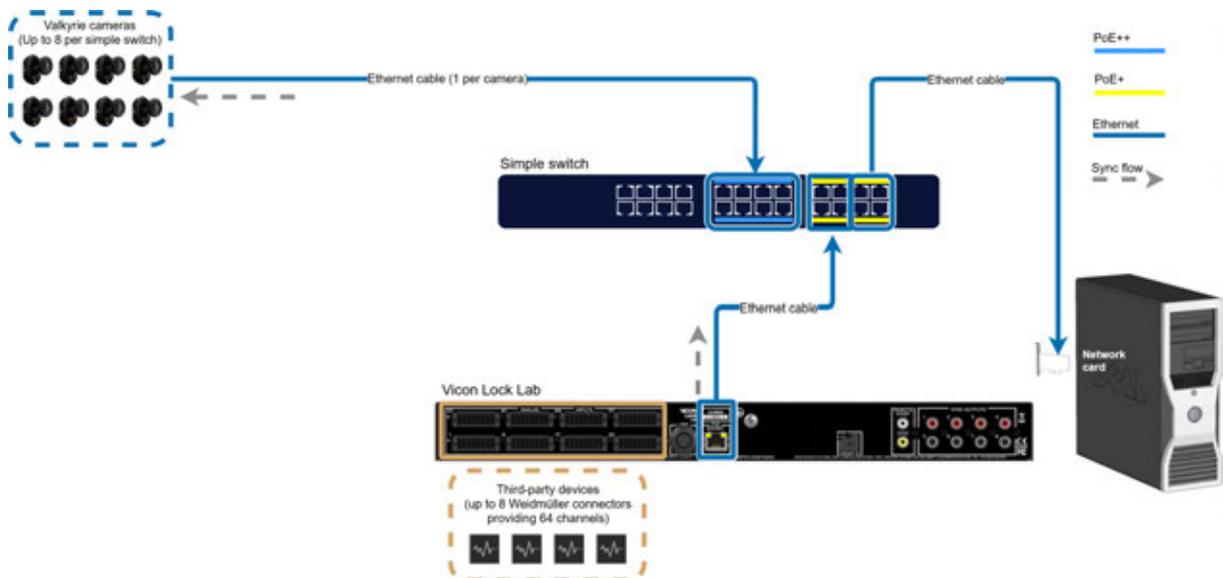
For further details on setting up this type of system, see [Set up a basic Vicon Valkyrie system, page 56](#).

Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system \

Basic Valkyrie system with a Vicon Lock

When a Vicon Lock is added to the system, it enables analog capture (Lock Lab only), synchronization of output devices, interfacing with remote triggering devices, and synchronization to genlock/timecode video sources (Lock Studio only), as well as VESA stereo video sources.

This diagram shows an example of a basic system of up to eight Valkyrie cameras with a Lock Lab to connect third-party analog devices. As in the [Basic system, page 72](#), the cameras are connected to a simple switch (see [Ethernet switches in Valkyrie systems, page 65](#)) and in this system, the Lock Lab is also connected to the same switch.

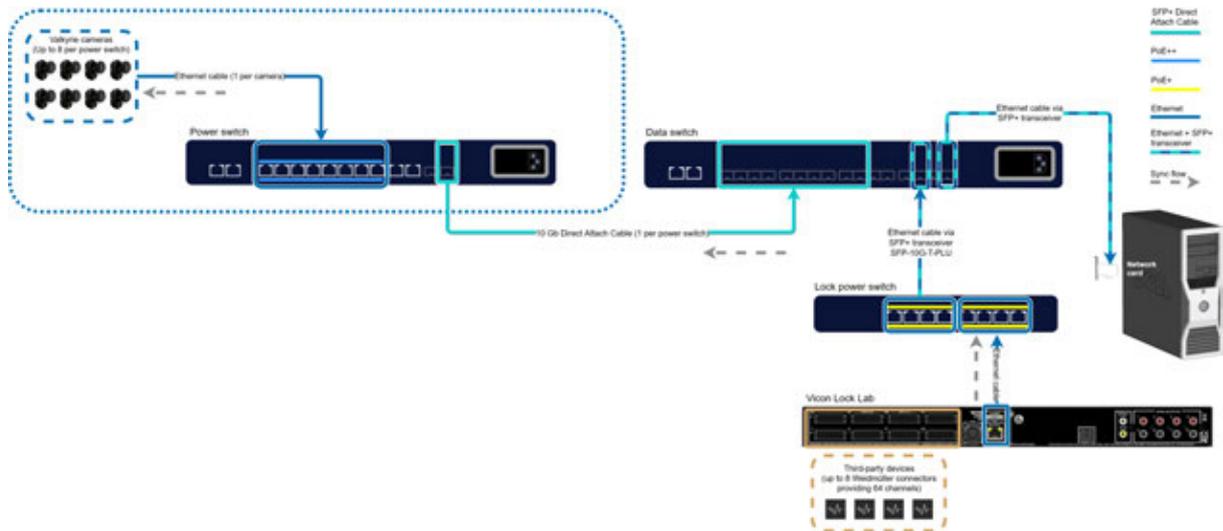


For more information on this type of system, see [Add a Vicon Lock to a basic Valkyrie system, page 62](#).

Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system \

Vicon Valkyrie system with up to 80 cameras and a Lock

The following diagram shows a system for up to 80 Valkyrie cameras, with more PoE++ switches and a Vicon Lock Lab added via a Lock power switch (see [Ethernet switches in Valkyrie systems, page 65](#)). Other current Vicon Locks can be added in the same way.



In a system that requires more than one Ethernet switch and includes up to 80 Valkyrie cameras:

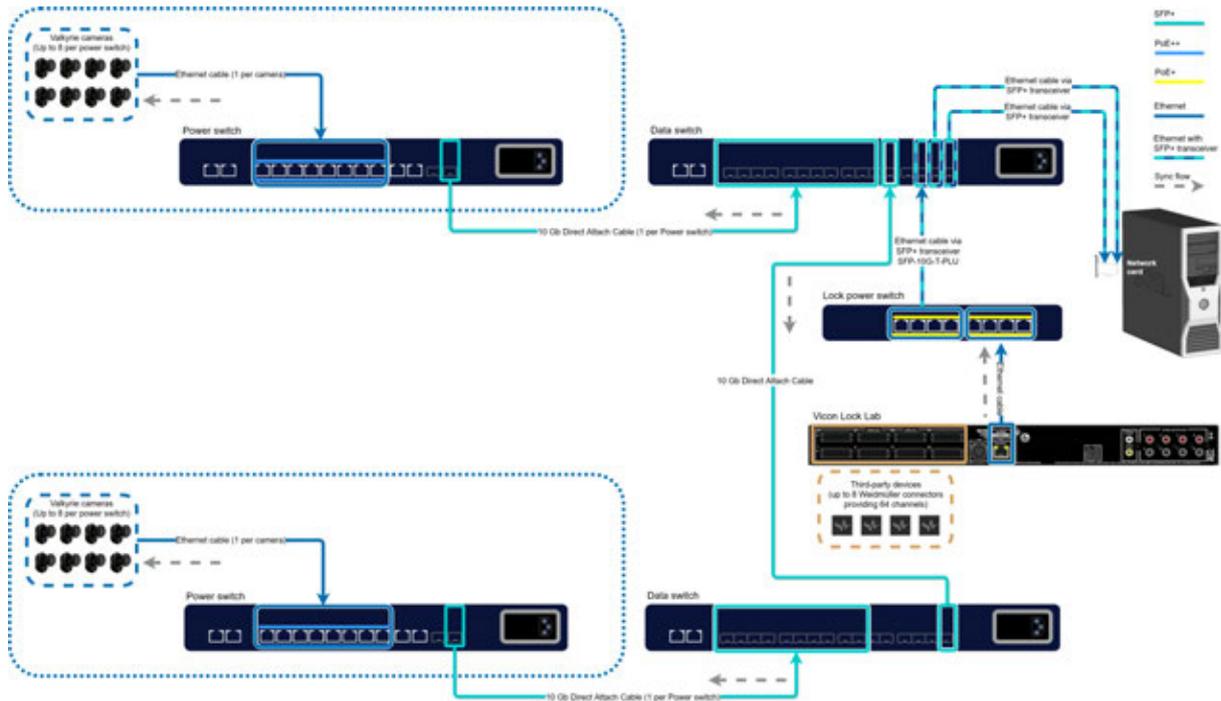
- The sync source camera (the one that outputs the Vicon Ethernet sync packet) is attached to the primary Ethernet switch, which is the switch that is connected to the host PC (in the above system, it is a data switch). For an explanation of the types of switches that can be included in a Valkyrie system see [Ethernet switches in Valkyrie systems, page 65](#).
- To ensure correct synchronization of your system when multiple Ethernet switches are used, you must either add a Lock to the primary Ethernet switch (ie, the switch that is connected to the PC), or ensure that a camera connected to the primary Ethernet switch is selected in the Vicon application software to be the sync source.
- In the above example, the Lock is the sync source and is connected via a Lock switch to a data switch, which is the primary switch.
- Up to 8 Valkyrie cameras can be connected to the power switch and up to 10 power switches can connect to the data switch.

Remember that, when you connect switches, one uplink port is taken on each switch in connecting the two, as shown in the diagram.

Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system \

Vicon Valkyrie system with up to 160 cameras and a Lock

The following diagram shows a system for up to 160 Valkyrie cameras, with more PoE++ switches and a Vicon Lock Lab added via a Lock switch.



In a system that requires more than one Ethernet switch and includes up to 160 Valkyrie cameras:

- To ensure correct synchronization of your system, you must either:
 - Connect a Lock to the primary switch (ie, the switch that is connected to the PC).
 - or
 - Ensure that a camera connected to the primary switch is selected in the Vicon application software to be the sync source.

In the above example, the Lock is the sync source and is connected via a Lock switch to a data switch, which is the primary switch. For an explanation of the types of switches that can be included in a Valkyrie system, see [Ethernet switches in Valkyrie systems, page 65](#).

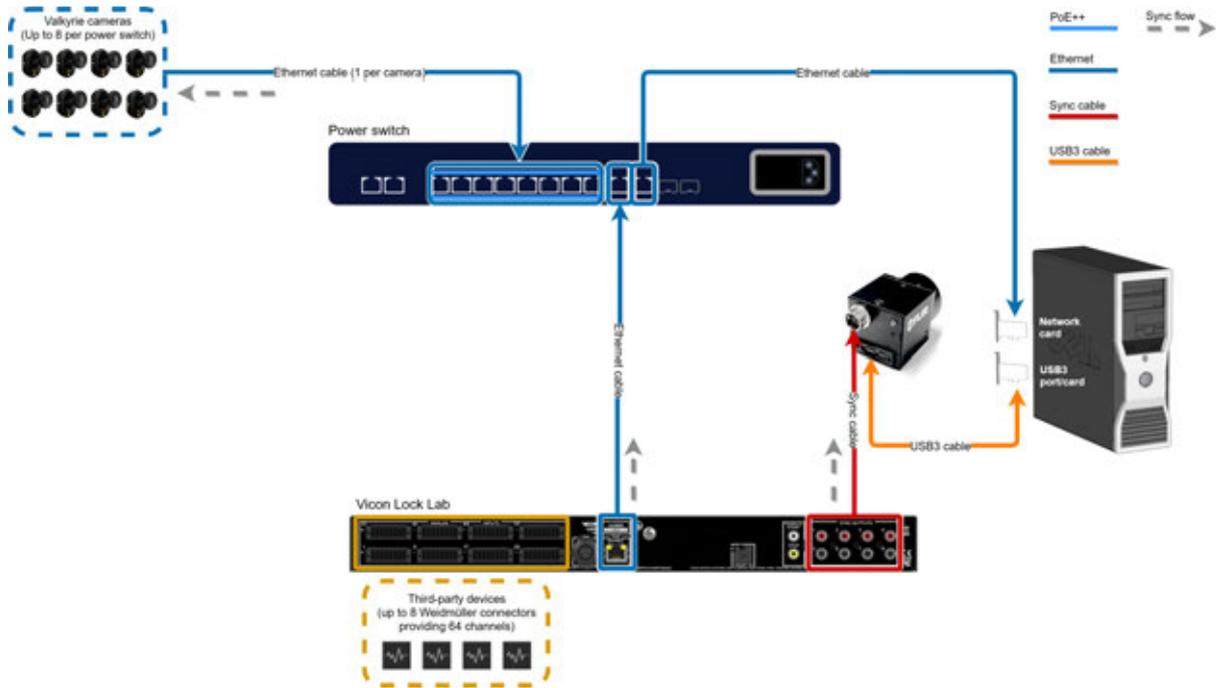
- If a camera is the sync source (the one that outputs the Vicon Ethernet sync packet), ensure it is connected to the primary switch, which is the switch that connects to the host PC (in the above system, it is a data switch).
- Up to 8 Valkyrie cameras can connect to the power switch and up to 10 power switches can connect to the data switch.

Remember that, when you connect switches, one port is taken on each switch in connecting the two, as shown in the diagram.

Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system \

Valkyrie system with a Vicon Lock and FLIR camera

This diagram shows a simple Valkyrie system with a supported FLIR camera (Teledyne FLIR Blackfly S) connected via a Vicon Lock Lab. Optical data and data from the FLIR camera is routed separately.

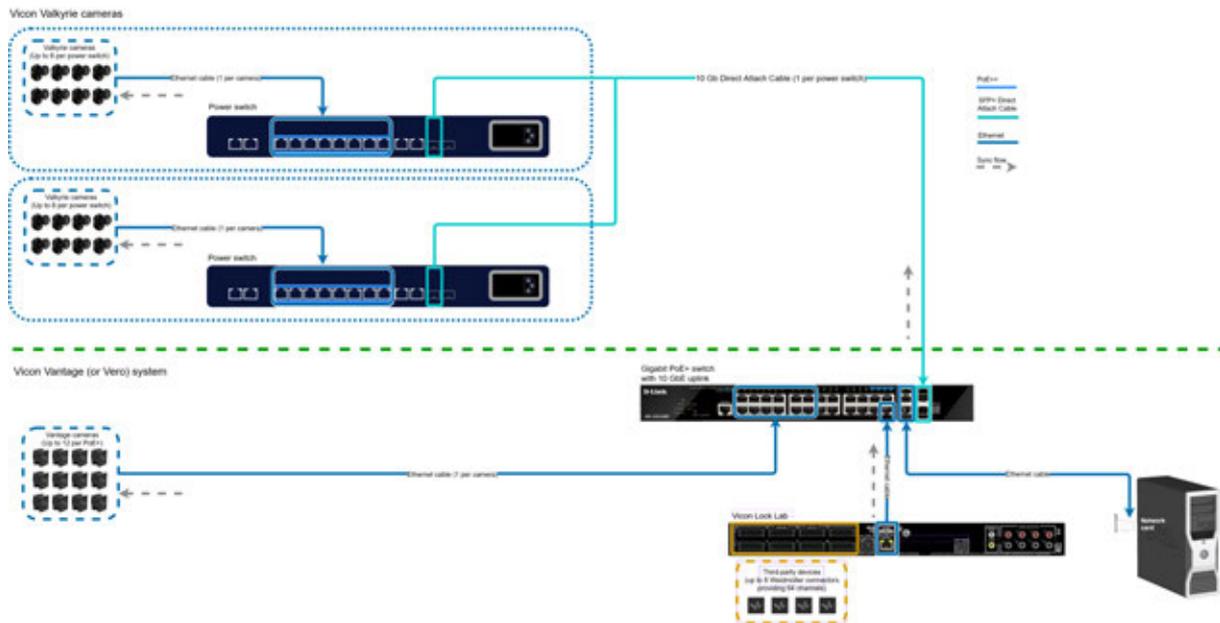


For more information on this type of system, see [Add supported FLIR cameras to a Vicon Valkyrie system, page 67](#).

Build a Vicon Valkyrie system
 \ Extend a basic Valkyrie system \

Mixed Vicon Valkyrie system (with Vantage)

A mixed Vicon Valkyrie system contains components from older Vicon camera systems. An example mixed Valkyrie system, with Valkyrie cameras connected to power switches, a primary Gigabit PoE+ Ethernet switch, Vantage cameras, and a Vicon Lock is shown in the following diagram.



For details on setting up a Vicon Valkyrie system that is integrated with a Vantage system, see [Set up a mixed Valkyrie system with Vantage or Vero cameras, page 78](#).

For further help with connecting large numbers of Valkyrie cameras into a Vantage system, contact [Vicon Support](#)²⁸.

²⁸ <https://www.vicon.com/support>

Build a Vicon Valkyrie system

\ Set up a mixed Valkyrie system with Vantage or Vero cameras \

Set up a mixed Valkyrie system with Vantage or Vero cameras

The following topics explain how to set up a system that consists of components from Vicon Vantage and Vicon Vero systems with those from a Vicon Valkyrie system.

For more information, see:

- [Understand mixed Vicon Valkyrie systems, page 79](#)
- [Set up a mixed system with up to 16 Valkyrie cameras, page 80](#)
- [Set up a mixed system with more than 16 Valkyrie cameras, page 81](#)

Build a Vicon Valkyrie system

\ Set up a mixed Valkyrie system with Vantage or Vero cameras \

Understand mixed Vicon Valkyrie systems

If you are mixing components from a Vicon Vantage or Vicon Vero system with a Vicon Valkyrie system, it is assumed that your older cameras are already set up and connected to PoE+ switch(es). For details of Vantage or Vero cameras, see the Vicon documentation supplied with your cameras.

The way in which the older system is connected to the Valkyrie system depends on the number of Valkyrie cameras you intend to use:

- If you are adding up to 16 Valkyrie cameras, you can keep your existing older system as it is and add the Valkyrie cameras via the primary switch. For more information, see [Set up a mixed system with up to 16 Valkyrie cameras, page 80](#).
- If you are adding more than 16 Valkyrie cameras, you must set up your Valkyrie cameras and switches, as described in [Set up a basic Vicon Valkyrie system, page 56](#) and [Extend a basic Valkyrie system, page 61](#) and add the older cameras to the new Valkyrie system via a data switch. For more information, see [Set up a mixed system with more than 16 Valkyrie cameras, page 81](#).

Build a Vicon Valkyrie system

\ Set up a mixed Valkyrie system with Vantage or Vero cameras \

Set up a mixed system with up to 16 Valkyrie cameras

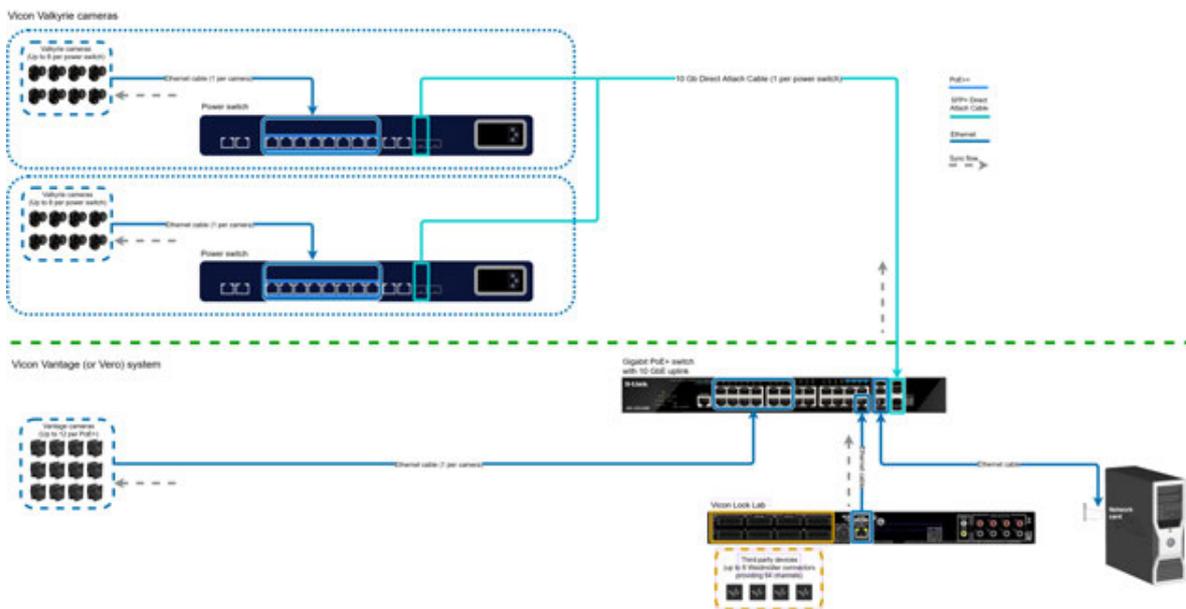
The following information describes how to add up to 16 Valkyrie cameras to an older system of up to 12 Vantage cameras or up to 23 Vero cameras.

In this type of system, you add the Valkyrie cameras to the existing system by connecting them to the primary switch (the switch that is directly connected to the PC).

To add up to 16 Valkyrie cameras to an older Vicon system:

- Connect the power switch to which the Valkyrie cameras are connected into one of the SFP+ ports of the primary PoE+ switch in the Vantage system.

In the following diagram, the power switches are each connected to an SFP+ port on the primary PoE+ switch in the Vantage system.



The primary Ethernet switch remains the sync source and hence outputs the Vicon sync data (Ethernet sync and time stamping).

Data flows from the cameras, through their respective PoE++ switches, through the primary switch to the host PC.

The Vicon sync packets travel in the opposite direction, with only accompanying light control data. This causes known deterministic switcher delay without jitter and possible packet loss.

Note

If your older system includes Vero cameras, remember that, because one port on the Gigabit PoE+ switch is occupied by the Lock, you can connect a maximum of 23 Vero cameras to the Ethernet (RJ45) ports.

Build a Vicon Valkyrie system

\ Set up a mixed Valkyrie system with Vantage or Vero cameras \

Set up a mixed system with more than 16 Valkyrie cameras

To add more than 16 Vicon Valkyrie cameras to a system that includes Vantage or Vero cameras, the older cameras are added to a new Valkyrie system using a data switch.

In mixed systems of this type, if the older system currently includes a Vicon Lock, you must connect it to the new primary switch (in the following example, this is the data switch).



Note

Except where noted, references to Vicon Lock, Lock units, and Lock apply to all current models of the Vicon Lock unit (at the time of publication, this includes Vicon Lock Studio and Vicon Lock Lab).

The Lock unit is automatically made sync source by the Vicon software. Both analog data and Vicon sync travel in the same direction initially. This is not problematic as the Lock manages the analog data transfer and Vicon sync data. Because the Lock controls the system timing, it knows when to transmit the sync packet and therefore when it can transmit analog data outside of this period.

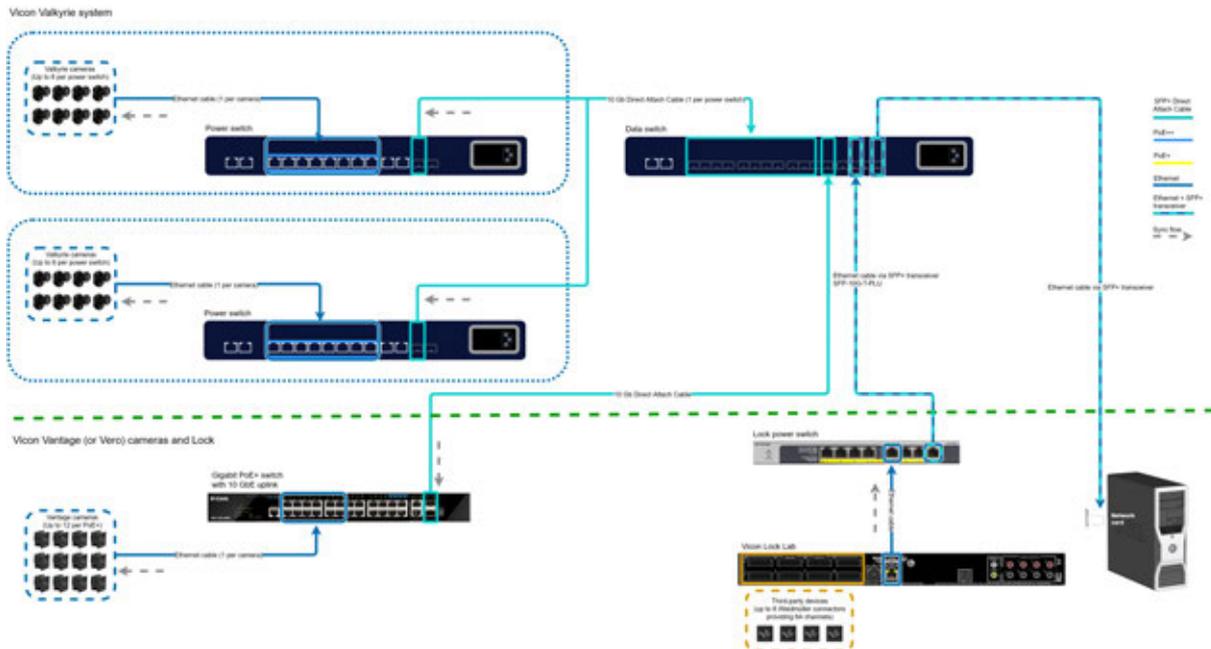
The Valkyrie Lock to Ethernet switch connection is necessary to maintain correct synchronization to the Lock. Ethernet switches and Lock units do not use Vicon sync packets for synchronization. All ports use a Vicon proprietary signal for synchronization.

Build a Vicon Valkyrie system

\ Set up a mixed Valkyrie system with Vantage or Vero cameras \

To set up a mixed system with more than 16 Valkyrie cameras:

1. Set up your Valkyrie system as described in [Set up a basic Vicon Valkyrie system, page 56](#) and [Extend a basic Valkyrie system, page 61](#), ensuring that the PC is connected to the primary switch (in the following example, this is the data switch). You can connect up to 10 power switches to the data switch.
2. Connect the cameras from the older system to the primary switch in the Valkyrie system (in the following example, this is the data switch). You can connect up to 10 Gigabit PoE+ switches to the remaining SFP+ ports on the data switch
3. If the older system includes a Lock, connect it to the primary switch (in the following example, this is the data switch and the Lock is connected via a Lock power switch) in the Valkyrie system.



Vicon Valkyrie technical specifications

Vicon Valkyrie technical specifications

The following topics provide technical specifications for Vicon Valkyrie cameras, including their lenses and strobe units.

- [VK26 camera specifications, page 84](#)
- [VK16 camera specifications, page 90](#)
- [VK8 camera specifications, page 96](#)
- [Vicon Valkyrie cameras lens specifications, page 102](#)
- [Vicon Valkyrie cameras strobe unit specifications, page 106](#)

For technical specifications for Vicon Lock connectivity devices, see Vicon Lock unit technical specifications in the *Vicon Systems Setup Guide*.

Vicon Valkyrie technical specifications
 \ VK26 camera specifications \

VK26 camera specifications

The following table provides technical specifications and performance indicators for the VK26 camera. Superscripted numbers indicate additional information provided in the [VK26 specification table notes, page 88](#).

Vicon Valkyrie VK26 camera specifications	
Performance:	
Maximum frame rate (fps) at full resolution	150 ¹ , page 88
Maximum frame rate (fps) at partial scan	2,000 ¹ , page 88
Frame rates (fps)	23.976–2,000
Sensor:	
Sensor type	CMOS
Sensor resolution (pixels)	5120 H x 5120 V
Number of pixels	26,214,400
Pixel size	2.5 microns x 2.5 microns
Optical format	1.1"
Physical sensor size (mm)	12.8 mm (H) x 12.8 mm (V), 18.1 mm (Diagonal)
Shutter type	Global shutter ² , page 88
Aspect ratio	1:1

Vicon Valkyrie technical specifications
 \ VK26 camera specifications \

Vicon Valkyrie VK26 camera specifications

On-camera processing:

256 shades and grayscale processing	Yes ³ , page 88
Grayscale depth	8-bit
Sub pixel resolution	1,310,720 x 1,310,720
On-board processors	3 processors
On-camera masking	Yes ⁴ , page 88
In-camera dynamic large blob eliminator	Yes ⁵ , page 88
Software masking	Yes
Auto masking	Yes
On-camera thresholding	Yes
Threshold grid size (tiles)	320 x 320
Threshold grid tile dimensions (pixels)	16 x 16
Camera output modes	5 ⁶ , page 88
Full frame preview output	Yes ⁷ , page 88

Vicon Valkyrie technical specifications
 \ VK26 camera specifications \

Vicon Valkyrie VK26 camera specifications

Strobe/Ringlight:

Type available	850 nm (Infrared (IR))
Number of LEDs	22
Secondary optic	Wide angle light spread; remove for narrow light spread
Strobe electronics	Integrated, software reprogrammable and controlled
Adjustable illumination	Yes
Adjustable levels	1,000 (software controlled)
View angle (Set by secondary optic)	54° or 72°

Physical:

Camera housing	Complex mold custom die-cast aluminum
Camera body dimensions	202 mm (H) x 150 mm (W) x 210 mm (D)
Weight (including strobe, excluding lens)	2.87 kg
Number of mount points	2

Vicon Valkyrie technical specifications
 \ VK26 camera specifications \

Vicon Valkyrie VK26 camera specifications

Camera architecture:

Software and firmware upgradable	Yes
Upgrade methods	Via the the Vicon Firmware Update Utility ^{8, page 88}
Connector	A single RJ45 connector to the Ethernet switch
Cabling	Cat6 or Cat6a (Gigabit Ethernet with power and sync over Ethernet)
Power supply	48V <ul style="list-style-type: none"> • 25.5 W when connected to PoE+ (IEEE 802.3at-2009) • 35 W when connected to PoE++ (IEEE 802.3bt-2018)
Maximum number of cameras supported per Ethernet switch	Switch-dependent (see Understand when additional switches are required, page 64).
Lens type supported	Proprietary Vicon varifocal 54° to 72° angle field of view (9.4 mm to 12.5 mm)
Plug and play compatibility	Yes
Mixed camera system compatibility	Interoperable with all Vero and Vantage cameras, as well as supported FLIR cameras (via a Vicon Lock)
System connectivity/ communication	Gigabit Ethernet
Communication status indicators	Yes
Camera number indicator / information display	Yes
Camera status indicators	On camera and in software
Tap for Select notification	Yes
IP addressable	Yes
IP reconfigurable	Yes
Cooling	Advanced thermal design

Vicon Valkyrie technical specifications
 \ VK26 camera specifications \

Vicon Valkyrie VK26 camera specifications	
Operating temperature:	
Maximum temperature	35°C ⁹ , page 89
Minimum temperature	-5°C ⁹ , page 89
Environmental and ingress protection regulations:	
RoHS compliant	Yes
IP (Ingress Protection) rating	IP65 ¹⁰ , page 89

VK26 specification table notes

- Increased frame rates:** Selecting a frame rate greater than full resolution automatically reduces image size by windowing. This keeps the pixel rate the same by transmitting a greater number of smaller images per second. You specify the capture frame rate of the Valkyrie cameras in the Vicon application software. Valkyrie cameras are capable of capturing up to a maximum of 2,000 fps, but the actual frame rate you can specify depends on the Vicon application software you are using. For details, see your Vicon software documentation. Above 150 fps, the amount of light emitted per frame is linearly reduced. The light emitted per frame at 300 fps is half that output per frame at 150 fps. (The total strobed light output remains the same).
- Shuttering:** The global shutter overcomes the negative effects of using rolling shutters for motion capture.
- Full marker grayscale:** Marker centers are calculated based on every pixel of grayscale available for the marker, not just the detected marker edges. An on-camera circularity test ensures merged or partially occluded markers which need high-level processing are sent in full grayscale to the Vicon Valkyrie host PC.
- On-camera masking:** This removes areas of the sensor where undesirable static light sources are recorded, for example strobes from other cameras.
- Blob elimination:** Camera firmware automatically removes undesirable image data including both large blobs (eg, sunlight reflections) and/or an unusually large number of blobs.
- Output modes:** Automatic (centers for circular markers, grayscale for overlapping/partially occluded markers), Centers Only, Grayscale Only, Centers/Grayscale, and Preview (the entire sensor image).
- Preview mode:** The full image is lightly filtered, decimated and transmitted to the Valkyrie host at 30 fps (variable). This reduces the quantity of preview video data to a level that can be transmitted over Gigabit Ethernet to the Vicon Valkyrie host PC.
- Vicon Firmware Update Utility:** Accessible either as a standalone application or through your Vicon application software (via an icon on the toolbar or from the Help menu).

Vicon Valkyrie technical specifications
 \ VK26 camera specifications \

9. **Operating temperature:** While Vicon cameras may operate outside the given limits, these are the temperatures to which Vicon has tested the cameras. If the cameras are operated outside of these limits, image quality may be degraded, the external surface temperatures may exceed the relevant safety limits, and any failures are not covered under warranty.
10. **IP65 rating:** Only applies if the lens cover and IP65 cable cap are correctly fitted. If the lens cover and/or cable cap are not present or are incorrectly fitted, the camera is not IP65-rated.

Vicon Valkyrie technical specifications
 \ VK16 camera specifications \

VK16 camera specifications

The following table provides technical specifications and performance indicators for the VK16 camera. Superscripted numbers indicate additional information provided in the [VK16 specification table notes, page 94](#).

Vicon Valkyrie VK16 camera specifications	
Performance:	
Maximum frame rate (fps) at full resolution	240 ¹ , page 94
Maximum frame rate (fps) at partial scan	2,000 ¹ , page 94
Frame rates (fps)	23.976–2,000
Sensor:	
Sensor type	CMOS
Sensor resolution (pixels)	5120 H x 3152 V
Number of pixels	16,138,240
Pixel size	2.5 microns x 2.5 microns
Physical sensor size (mm)	12.80 mm (H) x 7.88mm (V), 15.03mm (Diagonal)
Optical format	1"
Shutter type	Global shutter ² , page 94
Aspect ratio	8:5

Vicon Valkyrie technical specifications
 \ VK16 camera specifications \

Vicon Valkyrie VK16 camera specifications

On-camera processing:

256 shades and grayscale processing	Yes ³ , page 94
Grayscale depth	8-bit
Sub pixel resolution	1310720 X 806912 (1/256 pixel resolution)
On-board processors	3 processors
On-camera masking	Yes ⁴ , page 94
In-camera dynamic large blob eliminator	Yes ⁵ , page 94
Software masking	Yes
Auto masking	Yes
On-camera thresholding	Yes
Threshold grid size (tiles)	320 x 197
Threshold grid tile dimensions (pixels)	16 x 16
Camera output modes	5 ⁶ , page 94
Full frame preview output	Yes ⁷ , page 94

Vicon Valkyrie technical specifications
 \ VK16 camera specifications \

Vicon Valkyrie VK16 camera specifications

Strobe/Ringlight:

Type available	850 nm (Infrared (IR))
Number of LEDs	22
Secondary optic	Wide angle light spread; remove for narrow light spread
Strobe electronics	Integrated, software reprogrammable and controlled
Adjustable illumination	Yes
Adjustable levels	1,000 (software controlled)
View angle (Set by secondary optic)	54° or 72°

Physical:

Camera housing	Complex mold custom die-cast aluminum
Camera body dimensions	202 mm (H) x 150 mm (W) x 210 mm (D)
Weight (including strobe, excluding lens)	2.87 kg
Number of mount points	2

Vicon Valkyrie technical specifications
 \ VK16 camera specifications \

Vicon Valkyrie VK16 camera specifications

Camera architecture:

Software and firmware upgradable	Yes
Upgrade methods	Via the the Vicon Firmware Update Utility ⁸ , page 94
Connector	A single RJ45 connector to the Ethernet switch
Cabling	Cat6 or Cat6a (Gigabit Ethernet with power and sync over Ethernet)
Power supply	48V <ul style="list-style-type: none"> • 25.5 W when connected to PoE+ (IEEE 802.3at-2009) • 35 W when connected to PoE++ (IEEE 802.3bt-2018)
Maximum number of cameras supported per Ethernet switch	Switch-dependent (see Understand when additional switches are required , page 64)
Lens type supported	Proprietary Vicon varifocal 54° to 72° angle field of view (9.4 mm to 12.5 mm)
Plug and play compatibility	Yes
Mixed camera system compatibility	Interoperable with all Vero and Vantage cameras, as well as supported FLIR cameras (via a Vicon Lock)
System connectivity/ communication	Gigabit Ethernet
Communication status indicators	Yes
Camera number indicator / information display	Yes
Camera status indicators	On camera and in software
Tap for Select notification	Yes
IP addressable	Yes
IP reconfigurable	Yes
Cooling	Advanced thermal design

Vicon Valkyrie technical specifications
 \ VK16 camera specifications\

Vicon Valkyrie VK16 camera specifications

Operating temperature:

Maximum temperature 35°C ⁹, page 95

Minimum temperature -5°C ⁹, page 95

Environmental and ingress protection regulations:

RoHS compliant Yes

IP (Ingress Protection) rating IP65 ¹⁰, page 95

VK16 specification table notes

- Increased frame rates:** Selecting a frame rate greater than full resolution automatically reduces image size by windowing. This keeps the pixel rate the same by transmitting a greater number of smaller images per second. You specify the capture frame rate of the Valkyrie cameras in the Vicon application software. Valkyrie cameras are capable of capturing up to a maximum of 2,000 fps, but the actual frame rate you can specify depends on the Vicon application software you are using. For details, see your Vicon software documentation. Above 240 fps, the amount of light emitted per frame is linearly reduced. The light emitted per frame at 480 fps is half that output per frame at 240 fps. (The total strobed light output remains the same).
- Shuttering:** The global shutter overcomes the negative effects of using rolling shutters for motion capture.
- Full marker grayscale:** Marker centers are calculated based on every pixel of grayscale available for the marker, not just the detected marker edges. An on-camera circularity test ensures merged or partially occluded markers which need high-level processing are sent in full grayscale to the Vicon Valkyrie host PC.
- On-camera masking:** This removes areas of the sensor where undesirable static light sources are recorded, for example strobes from other cameras.
- Blob elimination:** Camera firmware automatically removes undesirable image data including both large blobs (e.g. sunlight reflections) and/or an unusually large number of blobs.
- Output modes:** Automatic (centers for circular markers, grayscale for overlapping/partially occluded markers), Centers Only, Grayscale Only, Centers/Grayscale, and Preview (the entire sensor image).
- Preview mode:** The full image is lightly filtered, decimated and transmitted to the Valkyrie host at 30 fps (variable). This reduces the quantity of preview video data to a level that can be transmitted over Gigabit Ethernet to the Vicon Valkyrie host PC.
- Vicon Firmware Update Utility:** Accessible either as a standalone application or through your Vicon application software (via an icon on the toolbar or from the Help menu).

Vicon Valkyrie technical specifications
 \ VK16 camera specifications \

9. **Operating temperature:** While Vicon cameras may operate outside the given limits, these are the temperatures to which Vicon has tested the cameras. If the cameras are operated outside of these limits, image quality may be degraded, the external surface temperatures may exceed the relevant safety limits, and any failures are not covered under warranty.
10. **IP65 rating:** Only applies if the lens cover and IP65 cable cap are correctly fitted. If the lens cover and/or cable cap are not present or are incorrectly fitted, the camera is not IP65-rated.

Vicon Valkyrie technical specifications
 \ VK8 camera specifications \

VK8 camera specifications

The following table provides technical specifications and performance indicators for the VK8 camera. Superscripted numbers indicate additional information provided in the [VK8 specification table notes, page 100](#).

Vicon Valkyrie VK8 camera specifications	
Performance:	
Maximum frame rate (fps) at full resolution	500 ¹ , page 100
Maximum frame rate (fps) at partial scan	2,000 ¹ , page 100
Frame rates (fps)	23.976–2,000
Sensor:	
Sensor type	CMOS
Sensor resolution (pixels)	3712 H x 2176 V
Number of pixels	8,077,312
Pixel size	4.5 microns x 4.5 microns
Physical sensor size (mm)	16.70 mm (H) x 9.79 mm (V), 19.36 mm (Diagonal)
Optical format	1.2"
Shutter type	Global shutter ² , page 100
Aspect ratio	17:10

Vicon Valkyrie technical specifications
 \ VK8 camera specifications \

Vicon Valkyrie VK8 camera specifications

On-camera processing:	
256 shades and grayscale processing	Yes ³ , page 100
Grayscale depth	8-bit
Sub pixel resolution	950,272 x 557,056 (1/256 pixel resolution)
On-board processors	3 processors
On-camera masking	Yes ⁴ , page 100
In-camera dynamic large blob eliminator	Yes ⁵ , page 100
Software masking	Yes
Auto masking	Yes
On-camera thresholding	Yes
Threshold grid size (tiles)	244 x 128
Threshold grid tile dimensions (pixels)	16 x 16
Camera output modes	5 ⁶ , page 100
Full frame preview output	Yes ⁷ , page 100

Vicon Valkyrie technical specifications
 \ VK8 camera specifications \

Vicon Valkyrie VK8 camera specifications

Strobe/Ringlight:

Type available	850 nm (Infrared (IR))
Number of LEDs	22
Secondary optic	Wide angle light spread; remove for narrow light spread
Strobe electronics	Integrated, software reprogrammable and controlled
Adjustable illumination	Yes
Adjustable levels	1,000 (software controlled)
View angle (Set by secondary optic)	54° or 72°

Physical:

Camera housing	Complex mold custom die-cast aluminum
Camera body dimensions	202 mm (H) x 150 mm (W) x 210 mm (D)
Weight (including strobe, excluding lens)	2.87 kg
Number of mount points	2

Vicon Valkyrie technical specifications
 \ VK8 camera specifications \

Vicon Valkyrie VK8 camera specifications

Camera architecture:

Software and firmware upgradable	Yes
Upgrade methods	Via the the Vicon Firmware Update Utility 8, page 100
Connector	A single RJ45 connector to the Ethernet switch.
Cabling	Cat6 or Cat6a (Gigabit Ethernet with power and sync over Ethernet)
Power supply	48V <ul style="list-style-type: none"> • 25.5 W when connected to PoE+ (IEEE 802.3at-2009) • 35 W when connected to PoE++ (IEEE 802.3bt-2018)
Maximum number of cameras supported per Ethernet switch	Switch-dependent (see Understand when additional switches are required, page 64)
Lens type supported	Proprietary Vicon varifocal 72° to 54° angle field of view (11.5 to 16.4 mm)
Plug and play compatibility	Yes
Mixed camera system compatibility	Interoperable with all Vero and Vantage cameras, as well as supported FLIR cameras (via a Vicon Lock)
System connectivity/ communication	Gigabit Ethernet
Communication status indicators	Yes
Camera number indicator / information display	Yes
Camera status indicators	On camera and in software
Tap for Select notification	Yes
IP addressable	Yes
IP reconfigurable	Yes
Cooling	Advanced thermal design

Vicon Valkyrie technical specifications
 \ VK8 camera specifications \

Vicon Valkyrie VK8 camera specifications

Operating temperature:

Maximum temperature 35°C ⁹, page 101

Minimum temperature -5°C ⁹, page 101

Environmental and ingress protection regulations:

RoHS compliant Yes

IP (Ingress Protection) rating IP65 ¹⁰, page 101

VK8 specification table notes

1. **Increased frame rates:** Selecting a frame rate greater than full resolution automatically reduces image size by windowing. This keeps the pixel rate the same by transmitting a greater number of smaller images per second. You specify the capture frame rate of the Valkyrie cameras in the Vicon application software. Valkyrie cameras are capable of capturing up to a maximum of 2,000 fps, but the actual frame rate you can specify depends on the Vicon application software you are using. For details, see your Vicon software documentation. Above 500 fps, the amount of light emitted per frame is linearly reduced. The light emitted per frame at 1000 fps is half that output per frame at 500 fps. (The total strobed light output remains the same).
2. **Shuttering:** The global shutter overcomes the negative effects of using rolling shutters for motion capture.
3. **Full marker grayscale:** Marker centers are calculated based on every pixel of grayscale available for the marker, not just the detected marker edges. An on-camera circularity test ensures merged or partially occluded markers which need high-level processing are sent in full grayscale to the Vicon Valkyrie host PC.
4. **On-camera masking:** This removes areas of the sensor where undesirable static light sources are recorded, for example strobes from other cameras.
5. **Blob elimination:** Camera firmware automatically removes undesirable image data including both large blobs (e.g. sunlight reflections) and/or an unusually large number of blobs.
6. **Output modes:** Automatic (centers for circular markers, grayscale for overlapping/partially occluded markers), Centers Only, Grayscale Only, Centers/Grayscale, and Preview (the entire sensor image).
7. **Preview mode:** The full image is lightly filtered, decimated and transmitted to the Valkyrie host at 30 fps (variable). This reduces the quantity of preview video data to a level that can be transmitted over Gigabit Ethernet to the Vicon Valkyrie host PC.
8. **Vicon Firmware Update Utility:** Accessible either as a standalone application or through your Vicon application software (via an icon on the toolbar or from the Help menu).

Vicon Valkyrie technical specifications
 \ VK8 camera specifications \

9. **Operating temperature:** While Vicon cameras may operate outside the given limits, these are the temperatures to which Vicon has tested the cameras. If the cameras are operated outside of these limits, image quality may be degraded, the external surface temperatures may exceed the relevant safety limits, and any failures are not covered under warranty.
10. **IP65 rating:** Only applies if the lens cover and IP65 cable cap are correctly fitted. If the lens cover and/or cable cap are not present or are incorrectly fitted, the camera is not IP65-rated.

Vicon Valkyrie technical specifications
 \ Vicon Valkyrie cameras lens specifications\

Vicon Valkyrie cameras lens specifications

This topic provides technical specifications for the lens that is used in Vicon Valkyrie cameras. For further details, contact Vicon or your nearest agent or distributor.

Valkyrie cameras are fitted with a lens that is suitable for the system use you specified on ordering. The lens's suitability is determined by various factors, including the focal length, which defines the Field of View (FOV), and the aperture range. The latter affects the amount of light seen by the image sensor and also governs the depth of field, the distance from the camera where the image is in focus.



Caution

Vicon Valkyrie cameras contain no user-serviceable components. For all servicing, and any alterations, you must return the camera to Vicon. Any attempt by you or any third party to alter or repair a Valkyrie camera may invalidate its warranty.

Vicon Valkyrie technical specifications
 \ Vicon Valkyrie cameras lens specifications \

Camera lens specification

The following tables provide technical specifications for the physical characteristics of the lens available for VK26, VK16, and VK8 cameras.

For Angle of View details for this lens, see [Angle of view information for Vicon Valkyrie cameras, page 105](#).

Component	Specification
Focal Length	9.4 mm to 18.8 mm
Format	4/3"
Aperture (f-stop) range	0–10 (see Vicon Valkyrie aperture values, page 104)
External dimensions	60 mm (diameter) x 111.5 mm (length)
Weight	0.496 kg

Note
 Vicon Valkyrie cameras are shipped with a focal length of 12 mm.

Vicon Valkyrie technical specifications
 \ Vicon Valkyrie cameras lens specifications\

Vicon Valkyrie aperture values

This table provides the calculated true aperture values for the marked aperture numbers on a Valkyrie varifocal lens. Due to the limitations of the test equipment, no values are available for the aperture number 10.

Marked aperture number	True aperture value (f-stop) at 18.8 mm focal length	True aperture value (f-stop) at 9.4 mm focal length
0	2.94	1.93
1	3.16	2.08
2	3.57	2.36
3	4.01	2.71
4	4.61	3.14
5	5.38	3.64
6	6.32	4.32
7	7.70	5.40
8	9.99	6.97
9	13.89	10.09

Vicon Valkyrie technical specifications
 \ Vicon Valkyrie cameras lens specifications \

Angle of view information for Vicon Valkyrie cameras

The following table gives information on the Angle of View at full resolution for the VK26, VK16, and VK8 cameras.

Camera variant	Focal length for 72° to 54° angle of view
VK26	9.4 mm to 12.5 mm
VK16	9.4 mm to 12.5 mm
VK8	11.5 mm to 16.4 mm

Note
Vicon Valkyrie cameras are shipped with a focal length of 12 mm.

The Valkyrie lens was designed to give 72° to 54° angle of view for each sensor but also works outside of those focal lengths. The secondary optics for the strobe spreads the light for the wider angle of view; without the secondary optics, the spread matches the narrower angle of view. Also note that:

- For focal lengths that give an angle of view wider than 72°, there is no strobe light coverage.
- For focal lengths that give an angle of view of 54° or narrower, we recommend that you do not use the secondary optics.

Vicon Valkyrie technical specifications
 \ Vicon Valkyrie cameras strobe unit specifications\

Vicon Valkyrie cameras strobe unit specifications

This topic provides technical specifications for the Infrared strobe unit that is available for the strobed Vicon Valkyrie cameras (VK26, VK16, VK8):

- [Camera strobe \(shutter\) durations, page 106](#)
- [Infrared strobe specifications, page 107](#)

Valkyrie strobe units use surface-mounted LEDs and have an optional secondary optic; this enables you to best match the light spread to the field of view obtained with the focal length setting of the lens.

Camera strobe (shutter) durations

The following table shows camera strobe duration for different specifications:

Maximum duration	Specification
0.5 ms	at 150 Hz progressive
0.25 ms	at 300 Hz progressive
0.125 ms	at 600 Hz progressive
0.0625 ms	at 1200 Hz progressive

The strobe light-ring emits light once per video frame and is precisely aligned with the global shutter of the image sensor. The duration is controlled in the camera's strobe settings in your Vicon application software. The strobe intensity, which controls the duration of the light being emitted, can be adjusted in 1/1000 increments from zero through to the maximum allowed. When increasing the strobe intensity, remember that very fast motion produces more motion blur, so you may have to compromise between lens aperture and strobe intensity settings.

The total power drawn from the Ethernet switch is the sum of the power drawn by the strobe and the camera itself. At a constant strobe intensity setting, the strobe power taken is proportional to the frame rate. Up to 150 fps, the strobe duration can be adjusted from zero to the maximum of 0.5 mS. In order not to exceed the allowable total maximum power taken, the strobe duration is automatically reduced as shown in the above table.

Note
At frame rates above 150 fps, there will be a corresponding fall in light output and therefore a possible reduction in the distance that markers will be seen.

Vicon Valkyrie technical specifications
 \ Vicon Valkyrie cameras strobe unit specifications \

Infrared strobe specifications

The following table provides technical specifications and performance indicators for Vicon Valkyrie Infrared (IR) strobe units.

Component	Specification
Strobe active source (AlGaAs LEDs)	22
Wavelength	850 nm
Strobe viewing angle (to half luminous intensity). Set by secondary optics	54° and 72°
Time averaged irradiance (in W.m-2)	69.65 (PoE+), 82.91 (PoE++) ¹
Maximum power consumption (per camera)	25W (PoE+) or 35W (PoE++), running at 150 fps, maximum strobe setting
RoHS compliant	Yes

¹ Given the following assumptions:

- Ideal overlap of radiation characteristics of array diodes
- IEC 62471-1 classification distance is 200 mm
- Ambient temperature is 25 degrees C.
- Low visual stimulus at 850nm
- Calculation is for >1000 seconds.

Vicon Valkyrie regulatory, safety and warranty information

The following topics provide important and required consumer information on how Vicon Valkyrie hardware complies with applicable requirements and standards, including product recycling. The certification that Vicon Valkyrie systems have achieved for meeting stated applicable standards is included. Guidance on the safe operation of your Vicon Valkyrie system, as well as information regarding the system warranty, is also provided.

 Note that none of the certification relating to Valkyrie is for medical usage and no fitness for medical usage is implied.

For more information, see:

- [Vicon Valkyrie \(VK26\) Declaration of Conformity, page 109](#)
- [Vicon Valkyrie \(VK16\) Declaration of Conformity, page 112](#)
- [Radio and television interference, page 115](#)
- [Environmental regulations \(EU customers\), page 116](#)
- [Vicon ISO certification, page 118](#)
- [Vicon Valkyrie IP certification, page 121](#)
- [Vicon Valkyrie LED Product Classification, page 129](#)
- [Safety information, page 130](#)
- [Warranty information, page 132](#)

Vicon Valkyrie regulatory, safety and warranty information
\\ Vicon Valkyrie (VK26) Declaration of Conformity \\

Vicon Valkyrie (VK26) Declaration of Conformity



DECLARATION OF CONFORMITY

Manufacturer: Vicon Motion Systems Ltd

Address:
6 Oxford Pioneer Park,
Yarnton,
Oxfordshire,
OX5 1QU,
United Kingdom

Certification: BS EN ISO 9001:2015 (FS727312).
Product: Valkyrie Non-Medical
Model: VK26.
Brand Name: Vicon Valkyrie.
Description: Motion Capture System.

Vicon Motion Systems Ltd hereby declares under its sole authority that the product listed above meets the applicable Requirements, Standards, Regulations / Directives listed below. The product shall therefore apply the CE, UKCA WEEE Marks but is not approved for medical use.

Regulations / Directives.

Electromagnetic Compatibility to EMC Directive 2014/30/EU.
Electromagnetic Compatibility Regulations 2016.
Electrical Safety to Low Voltage Directive 2014/35/EU.
Electrical Equipment (Safety) Regulations 2016.
Waste Electrical and Electronic Equipment (WEEE) Directive 2012/19/EU.
Waste Electrical and Electronic Equipment Regulations 2013.

Standards relating to Mechanical and Environmental/Ingress Protection (IP).

BS EN 60529:1992+A2:2013 (Degrees of Protection Provided by Enclosures (IP Code)).
With reference to BS EN 60529:1992+A2:2013), the product is that of a rating of IP65.

Standards relating to Quality Management.

BS EN ISO 9001:2015 (Quality Management Systems. Requirements)

Standards relating to Product Safety.

BS EN IEC 62368-1:2020+A11:2020 (Audio/Video, Information and Communication Technology Equipment - Safety Requirements)
BS EN IEC 62368-3:2020 (Audio/Video, Information and Communication Technology Equipment - Safety Aspects for DC Power Transfer through Communication Cables and Ports)

Vicon Valkyrie regulatory, safety and warranty information \ Vicon Valkyrie (VK26) Declaration of Conformity\



BS EN 62471:2008 (Photobiological Safety of Lamps and Lamp Systems)

Standards relating to EMC (Electromagnetic Compatibility).

EN 60601-1-2:2015+A1:2021 (Medical Electrical Equipment - General Requirements for Basic Safety and Essential Performance. Collateral Standard: Electromagnetic Disturbances. Requirements and Tests)

EN 55032:2015/A11:2020 (Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements)

EN 55035:2017/A11:2020 (Electromagnetic Compatibility of Multimedia Equipment - Immunity Requirements)

EN 61000 Part 4 (Electromagnetic Compatibility (EMC) - Part 4. Testing and Measurement Techniques)

EN 61000-4-2: 2009 (Electromagnetic Compatibility (EMC) – Part 4-2: Testing and Measurement Techniques - Electrostatic Discharge Immunity Test)

EN 61000-4-3: 2006+A1: 2008 + A2: 2010 (Electromagnetic Compatibility (EMC) Part 4-3. Testing and Measurement Techniques. Radiated Radio-Frequency Electromagnetic Field Immunity Test)

EN 61000-4-4: 2012 (Electromagnetic Compatibility (EMC) – Part 4-4: Testing and Measurement Techniques - Electrical Fast Transient/Burst Immunity Test)

EN 61000-4-6: 2009 (Electromagnetic Compatibility (EMC) Part 4-6. Testing and Measurement Techniques. Immunity to conducted disturbances induced by Radio Frequency Fields)

EN 61000-4-5:2014+A1:2017 (Electromagnetic Compatibility (EMC) - Testing and Measurement Techniques - Surge Immunity Test)

BS EN 61000-4-11:2004+A1:2017 (Electromagnetic Compatibility (EMC) - Testing and Measurement Techniques. Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests)

FCC CFR 47 Part 15B: 2015 (+ ICES-003 Issue 7 declaration) (Radio Frequency Devices - Unintentional Radiators)

ANSI C63.4 2014 (Methods of Measurement of Radio Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz)

VCCI: April 2016 (Agreement of Voluntary Council for Interference by Information Technology Equipment)

VCCI-CISPR32: 2016 (Electromagnetic Compatibility of Multimedia Equipment – Emission Requirements)

CISPR 16-1-1: 2010 + AMD1: 2010 + AMD2: 2014 (Specification for Radio Disturbance and Immunity Measuring Apparatus and Method – Part 1-1: Radio Disturbance and Immunity Measuring Apparatus–Measuring Apparatus)

Vicon Valkyrie regulatory, safety and warranty information
\\ Vicon Valkyrie (VK26) Declaration of Conformity \\



CISPR 16-1-2: 2003 + AMD1: 2004 + AMD2: 2006 (Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods – Part 1-2: Radio Disturbance and Immunity Measuring Apparatus–Ancillary Equipment – Conducted Disturbances)

CISPR 16-1-4: 2010 + AMD1: 2012 (Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods –Part 1-4: Radio Disturbance and Immunity Measuring Apparatus –Ancillary Equipment –Radio Disturbances)

CISPR 16-2-1: 2008 + AMD1: 2010 + AMD2: 2013 (Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods –Part 2-1: Methods of Measurement of Disturbances and Immunity –Conducted Disturbance Measurements)

CISPR 16-2-3: 2010 + AMD1: 2010 (Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods –Part 2-3: Methods of Measurement of Disturbance and Immunity –Radiated Disturbance Measurements)

I, the undersigned, hereby declare that the Vicon Valkyrie (VK26) product conforms to the above Requirements and Standards.

Signature: 

Name: Adam Frank Daniel Hunt

Title/Role: ISO/Compliance Manager

Date: 28th of April 2023.

Vicon Valkyrie regulatory, safety and warranty information
 \ Vicon Valkyrie (VK16) Declaration of Conformity\

Vicon Valkyrie (VK16) Declaration of Conformity



DECLARATION OF CONFORMITY

Manufacturer: Vicon Motion Systems Ltd

Address:
 6 Oxford Pioneer Park,
 Yarnton,
 Oxfordshire,
 OX5 1QU,
 United Kingdom

Certification: BS EN ISO 9001:2015 (FS727312).
Product: Valkyrie Non-Medical
Model: VK16.
Brand Name: Vicon Valkyrie.
Description: Motion Capture System.

Vicon Motion Systems Ltd hereby declares under its sole authority that the product listed above meets the applicable Requirements, Standards, Regulations / Directives listed below. The product shall therefore apply the CE, UKCA WEEE Marks but is not approved for medical use.

Regulations / Directives.

Electromagnetic Compatibility to EMC Directive 2014/30/EU.
 Electromagnetic Compatibility Regulations 2016.
 Electrical Safety to Low Voltage Directive 2014/35/EU.
 Electrical Equipment (Safety) Regulations 2016.
 Waste Electrical and Electronic Equipment (WEEE) Directive 2012/19/EU.
 Waste Electrical and Electronic Equipment Regulations 2013.

Standards relating to Mechanical and Environmental/Ingress Protection (IP).

BS EN 60529:1992+A2:2013 (Degrees of Protection Provided by Enclosures (IP Code)).
 With reference to BS EN 60529:1992+A2:2013), the product is that of a rating of IP65.

Standards relating to Quality Management.

BS EN ISO 9001:2015 (Quality Management Systems. Requirements)

Standards relating to Product Safety.

BS EN IEC 62368-1:2020+A11:2020 (Audio/Video, Information and Communication Technology Equipment - Safety Requirements)
 BS EN IEC 62368-3:2020 (Audio/Video, Information and Communication Technology Equipment - Safety Aspects for DC Power Transfer through Communication Cables and Ports)

Vicon Valkyrie regulatory, safety and warranty information
 \ Vicon Valkyrie (VK16) Declaration of Conformity \


<p>BS EN 62471:2008 (Photobiological Safety of Lamps and Lamp Systems)</p> <p><u>Standards relating to EMC (Electromagnetic Compatibility).</u></p> <p>EN 60601-1-2:2015+A1:2021 (Medical Electrical Equipment - General Requirements for Basic Safety and Essential Performance. Collateral Standard: Electromagnetic Disturbances, Requirements and Tests)</p> <p>EN 55032:2015/A11:2020 (Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements)</p> <p>EN 55035:2017/A11:2020 (Electromagnetic Compatibility of Multimedia Equipment - Immunity Requirements)</p> <p>EN 61000 Part 4 (Electromagnetic Compatibility (EMC) - Part 4. Testing and Measurement Techniques)</p> <p>EN 61000-4-2: 2009 (Electromagnetic Compatibility (EMC) – Part 4-2: Testing and Measurement Techniques - Electrostatic Discharge Immunity Test)</p> <p>EN 61000-4-3: 2006+A1: 2008 + A2: 2010 (Electromagnetic Compatibility (EMC) Part 4-3. Testing and Measurement Techniques. Radiated Radio-Frequency Electromagnetic Field Immunity Test)</p> <p>EN 61000-4-4: 2012 (Electromagnetic Compatibility (EMC) – Part 4-4: Testing and Measurement Techniques - Electrical Fast Transient/Burst Immunity Test)</p> <p>EN 61000-4-6: 2009 (Electromagnetic Compatibility (EMC) Part 4-6. Testing and Measurement Techniques. Immunity to conducted disturbances induced by Radio Frequency Fields)</p> <p>EN 61000-4-5:2014+A1:2017 (Electromagnetic Compatibility (EMC) - Testing and Measurement Techniques - Surge Immunity Test)</p> <p>BS EN 61000-4-11:2004+A1:2017 (Electromagnetic Compatibility (EMC) - Testing and Measurement Techniques. Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests)</p> <p>FCC CFR 47 Part 15B: 2015 (+ ICES-003 Issue 7 declaration) (Radio Frequency Devices - Unintentional Radiators)</p> <p>ANSI C63.4 2014 (Methods of Measurement of Radio Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz)</p> <p>VCCI: April 2016 (Agreement of Voluntary Council for Interference by Information Technology Equipment)</p> <p>VCCI-CISPR32: 2016 (Electromagnetic Compatibility of Multimedia Equipment – Emission Requirements)</p> <p>CISPR 16-1-1: 2010 + AMD1: 2010 + AMD2: 2014 (Specification for Radio Disturbance and Immunity Measuring Apparatus and Method – Part 1-1: Radio Disturbance and Immunity Measuring Apparatus–Measuring Apparatus)</p>

Vicon Valkyrie regulatory, safety and warranty information \\ Vicon Valkyrie (VK16) Declaration of Conformity\\



CISPR 16-1-2: 2003 + AMD1: 2004 + AMD2: 2006 (Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods – Part 1-2: Radio Disturbance and Immunity Measuring Apparatus–Ancillary Equipment – Conducted Disturbances)

CISPR 16-1-4: 2010 + AMD1: 2012 (Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods –Part 1-4: Radio Disturbance and Immunity Measuring Apparatus –Ancillary Equipment –Radio Disturbances)

CISPR 16-2-1: 2008 + AMD1: 2010 + AMD2: 2013 (Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods –Part 2-1: Methods of Measurement of Disturbances and Immunity –Conducted Disturbance Measurements)

CISPR 16-2-3: 2010 + AMD1: 2010 (Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods –Part 2-3: Methods of Measurement of Disturbance and Immunity –Radiated Disturbance Measurements)

I, the undersigned, hereby declare that the Vicon Valkyrie (VK26) product conforms to the above Requirements and Standards.

Signature: *AD Hunt*

Name: Adam Frank Daniel Hunt

Title/Role: ISO/Compliance Manager

Date: 23rd of May 2023.

Vicon Valkyrie regulatory, safety and warranty information
 \ Radio and television interference \

Radio and television interference

This topic contains information concerning compliance with regulations of radio and television interference.

For United States of America customers
Federal Communications Commission (FCC) Part 15 Information



This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules (CFR 47:Part 15:B:2013). These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Vicon Motion Systems Ltd is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For Canadian customers
Conformity to the Canadian Interference-Causing Equipment Regulations

This Class A digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations ICES-003:2004.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada ICES-003:2004.

Vicon Valkyrie regulatory, safety and warranty information
 \ Environmental regulations (EU customers)\

Environmental regulations (EU customers)

This section lists the directives that apply to Vicon Valkyrie systems.

This information applies only to European Union member states.

Vicon meets these European Commission directives concerning waste electrical and electronic equipment:

- Directives 2002/95/EC and 2011/65/EU (for details, see [Restriction of the use of certain hazardous substances in electrical and electronic equipment – RoHS and recast \(RoHS 2\)](#), page 116).
- [REACH Declaration of Conformity](#), page 117
- Directive 2002/96/EC (for details, see [Waste Electrical and Electronic Equipment \(WEEE\)](#), page 117).

Restriction of the use of certain hazardous substances in electrical and electronic equipment – RoHS and recast (RoHS 2)

This equipment is fully RoHS- and RoHS 2- compliant. RoHS Directive 2002/95/EC provides that new electrical and electronic equipment put on the market for the first time from 1 July 2006 should not contain lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBB), or polybrominated diphenyl ethers (PBDE). The European Union Directive [2011/65/EU](#)²⁹ provides that new electrical and electronic equipment put on the market for the first time from 3rd January 2014 shall not contain more than permitted levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBB), or polybrominated diphenyl ethers (PBDE; PentaBDE, OctaBDE; DecaBDE), Mercury (Hg).

²⁹ <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32011L0065>

Vicon Valkyrie regulatory, safety and warranty information \ Environmental regulations (EU customers) \

REACH Declaration of Conformity

Vicon Motion Systems Ltd is a manufacturer of electronic hardware. We are therefore considered a "downstream user" as far as the REACH document is concerned. Vicon Motion Systems Ltd is therefore not obligated to register with the European Agency for Chemicals 'ECHA'.

Products sold by Vicon Motion Systems Ltd are "articles" as defined in REACH (Article 3 Definitions). Moreover and under normal and reasonably foreseeable circumstances of application, the articles supplied shall not release any substance. For that, Vicon Motion Systems Ltd is neither obligatory for registration nor for the creation of material safety data sheets.

In order to assure our customers of the continual supply of reliable and safe products, we ensure that our suppliers fulfill all requirements regarding chemical substances and prepared materials.

Waste Electrical and Electronic Equipment (WEEE)

(Applicable in the European Union and other European countries with separate collection systems)



The use of the symbol as a marking on the equipment, accessories or literature indicates that this product and its electronic accessories (e.g. USB cable) may not be treated as household waste. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product.

Household users should contact either the retailer where they purchased this device, or their local government office, for details of where and how they can take these items for environmentally safe recycling.

Business users should contact their supplier and check the terms and conditions of the purchasing contract. This device and its electronic accessories should not be mixed with other commercial waste for disposal.

Vicon Valkyrie regulatory, safety and warranty information
\\ Vicon ISO certification\\

Vicon ISO certification

- [ISO 9001:2015 Certificate of Approval, page 119](#)
- [Certificate Schedule 727312, page 120](#)

Vicon Valkyrie regulatory, safety and warranty information
\\ Vicon ISO certification \\

ISO 9001:2015 Certificate of Approval



Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that: Vicon Motion Systems Ltd t/a Vicon
Unit 6 Oxford Industrial Park
Mead Road
Yarnton
Kidlington
OX5 1QU
United Kingdom

Holds Certificate Number: FS 727312

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

Design, manufacture and support of motion capture systems. Development of software for motion capture systems, measurement and analysis of three-dimensional structures.

For and on behalf of BSI:



Andrew Launn, EMEA Systems Certification Director

Original Registration Date: 2006-08-17

Effective Date: 2021-08-17

Latest Revision Date: 2021-07-22

Expiry Date: 2024-08-16



Page: 1 of 2

...making excellence a habit.™

This certificate was issued electronically and remains the property of BSI and is bound by the conditions of contract.
An electronic certificate can be authenticated [online](#).
Printed copies can be validated at www.bsigroup.com/ClientDirectory

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PP. Tel: + 44 345 080 9000
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.
A Member of the BSI Group of Companies.

Vicon Valkyrie regulatory, safety and warranty information
\\ Vicon ISO certification\\

Certificate Schedule 727312

Certificate No: FS 727312	
Location	Registered Activities
Vicon Motion Systems Ltd t/a Vicon Unit 6 Oxford Industrial Park Mead Road Yarnton Kidlington OX5 1QU United Kingdom	Design, manufacture and support of motion capture systems. development of software for motion captures systems, measurement and analysis of three-dimensional structures.
Vicon Motion Systems Inc 7738 Sth. Revere Parkway Suite 901 Centennial Colorado 80112 USA	Configuration, sales and support of motion capture systems ; including development of related software.

Original Registration Date: 2006-08-17 Effective Date: 2021-08-17
Latest Revision Date: 2021-07-22 Expiry Date: 2024-08-16

Page: 2 of 2

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An electronic certificate can be authenticated [online](#).
Printed copies can be validated at www.bsigroup.com/ClientDirectory

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PP. Tel: + 44 345 080 9000
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.
A Member of the BSI Group of Companies.

Vicon Valkyrie regulatory, safety and warranty information
 \ Vicon Valkyrie IP certification \

Vicon Valkyrie IP certification

The following certification relates to Vicon Valkyrie cameras.

- [Test certificate no: TRA057445CC02 – Ingress Protection, page 122](#)
- [Test certificate no: TRA057445CC03 – Ingress Protection, page 125](#)
- [Test certificate no: TRA057445CC04 - Ingress Protection, page 127](#)

Vicon Valkyrie regulatory, safety and warranty information
\\ Vicon Valkyrie IP certification\

Test certificate no: TRA057445CC02 – Ingress Protection



Test Certificate

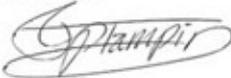
CERTIFICATE No: TRA057445CC02
ISSUE: A
DATE: 29/06/2022

PURPOSE OF TEST: Ingress Protection, IP6X
CLIENT ORDER No: POR015112
CLIENT: Vicon Motion Systems Ltd, Unit 6 Oxford Industrial Park, Mead Road, Yarnton, OXFORD, GB. OX5 1QU.

EQUIPMENT UNDER TEST:

EUT Description	Part No.	Element Stores No.	Receipt Date
Valkyrie Camera Assembly	BLY001AA	TRA-057445-S5	16/06/2022
Valkyrie Camera Assembly	BLY001AA	TRA-057445-S6	17/06/2022

TEST SPECIFICATIONS: In accordance with quotation TRA-057445-04 and BS EN 60529:1992+A2:2013
TEST DATE: 16/06/2022 to 17/06/2022
TEST LOCATION: Element Materials Technology, Rothwell Road, Warwick, Warwickshire, CV34 5JX

WRITTEN BY: 
Jerad Plampin
Environmental Test Engineer

APPROVED BY: 
Rob Sutton
Verification Controller

The results herein relate only to the particular samples of equipment tested and the specific tests performed, as detailed above, and in accordance with the contract. Full details of test results, modifications and marginal results are held by Element Materials Technology Warwick Ltd. This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF communique dated April 2017). No representation or warranty is given that the tests performed under the terms of contract constitute, in themselves, a sufficient programme for the client's purpose, nor that the client's equipment is suitable for any particular purpose, nor that any approval has or will be granted by Element Materials Technology Warwick Ltd or any other body. The contents of this certificate shall not be reproduced, except in full, without the written approval of Element Materials Technology Warwick Ltd.

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Vicon Valkyrie regulatory, safety and warranty information
 \ Vicon Valkyrie IP certification \



CERTIFICATE No: TRA057445CC02
 ISSUE: A
 DATE: 29/06/2022

TESTS CARRIED OUT:

IP4X - Protected Against Access to Hazardous Parts and Against Solid Foreign Objects
 Probe: 1.0^{+0.02} mm diameter x 100mm wire
 Force: 1N ± 10%

Any barriers, shapes and covers attached to or formed by the enclosure main electrical enclosure of S6 which could be removed without the use of a key or tool, were removed and the 100mm long access probe was applied to assess if the 1mm diameter probe could gain access to the openings of the enclosure or if a spherical object capable of motion, following a tortuous entry path could gain access to the openings of the enclosure, at a force of 1N. Specimen S5 was similarly assessed for access and entry path.

IP6X - Protected Against Access of Solid Foreign Objects - Dust Tight
 Duration: If extraction rate is 40-60 volumes per hour, duration is 2 hours.
 If extraction rate is less than 40 volumes per hour at a depression of ≤ -20mbar, test is continued until 80 volumes have been drawn through or 8 hours elapsed.
 Maximum Flow rate: 60 times the volume of the specimen per hour
 Maximum Vacuum: ≤ -20mbar

Note: All enclosures with first characteristic numeral 6 shall be deemed category 1.

The specimen S5 was connected to a vacuum pump, pressure indicator and flow meter to calculate the test duration. The specimen was mounted in the dust chamber and re-connected to the vacuum pump to provide a vacuum of up to 20 mbar below laboratory ambient pressure during the test. The test was carried out in accordance with the specification for a period of 3.13 hours.

TESTS RESULTS:

IP4X - Protected Against Access to Hazardous Parts and Against Solid Foreign Objects
 The specimens S5 and S6 were found to have no openings that could be penetrated by the 1.0mm Ø, 100mm long access probe reducing adequate clearance between the access probe and hazardous parts or access by a 1mm Ø spherical object capable of motion.

The main electrical enclosure as defined in Figure 1 of specimens TRA-057445-S5 and TRA-057445-S6 when installed as per the test configuration therefore satisfy the requirements of BS EN 60529:1992+A2:2013, IP4X.

IP6X - Protected Against Access of Solid Foreign Objects - Dust Tight
 After testing, the specimen S5 was cleaned externally before being opened for internal inspection.

No dust ingress was noted

The main electrical enclosure as defined in Figure 1 of specimen TRA-057445-S5 when installed as per the test configuration therefore satisfies the requirements of BS EN 60529:1992+A2:2013, IP6X .

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Vicon Valkyrie regulatory, safety and warranty information
 \ Vicon Valkyrie IP certification\



CERTIFICATE No: TRA057445CC02
ISSUE: A
DATE: 29/06/2022



Top Down View of the Tested Enclosure Included Within Red Box
Figure 1

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Vicon Valkyrie regulatory, safety and warranty information
 \ Vicon Valkyrie IP certification \

Test certificate no: TRA057445CC03 – Ingress Protection



Test Certificate

CERTIFICATE No: TRA057445CC03
ISSUE: A
DATE: 31/08/2022

PURPOSE OF TEST: Ingress Protection, IPX5
CLIENT ORDER No: POR015275
CLIENT: Vicon Motion Systems Ltd, Unit 6 Oxford Industrial Park, Mead Road, Yarnton, OXFORD, GB. OX5 1QU.
EQUIPMENT UNDER TEST:
EUT Description: Valkyrie Camera Assembly
Part Number: BLY001AA
Element Stores Number: TRA-057445-S11
Receipt date: 17/08/2022

TEST SPECIFICATIONS: In accordance with quotation TRA-057445-07 and BS EN 60529:1992+A2:2013
TEST DATE: 17/08/2022
TEST LOCATION: Element Materials Technology, Rothwell Road, Warwick, Warwickshire, CV34 5JX

WRITTEN BY: 
Jerad Plampin
Environmental Test Engineer

APPROVED BY: 
Rob Sutton
Verification Controller

The results herein relate only to the particular samples of equipment tested and the specific tests performed, as detailed above, and in accordance with the contract. Full details of test results, modifications and marginal results are held by Element Materials Technology Warwick Ltd. This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF communique dated April 2017). No representation or warranty is given that the tests performed under the terms of contract constitute, in themselves, a sufficient programme for the client's purpose, nor that the client's equipment is suitable for any particular purpose, nor that any approval has or will be granted by Element Materials Technology Warwick Ltd or any other body. The contents of this certificate shall not be reproduced, except in full, without the written approval of Element Materials Technology Warwick Ltd.

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Vicon Valkyrie regulatory, safety and warranty information
 \ Vicon Valkyrie IP certification \



CERTIFICATE No: TRA057445CC03
ISSUE: A
DATE: 31/08/2022

TESTS CARRIED OUT:

IPX5 – Protected Against Water Jets

Nozzle:	6.3 mm diameter
Flow Rate:	12.5 litres per minute \pm 5%
Duration:	1 minute per m ² of surface area of enclosure from all practicable directions (3 minutes minimum)
Distance:	2.5 to 3 metres
Water Temperature:	Within \pm 5 °C of specimen temperature

The temperature of the water and the specimen was measured to ensure the differential was within 5°C. The specimen was mounted in its normal operating orientation and sprayed from all practicable directions for a period of 3 minutes in accordance with the specification.

TESTS RESULTS:

IPX5 – Protected Against Water Jets

After testing, the specimen was dried externally before being opened for internal inspection.

No water ingress was found.

Specimen TRA-057445-S11 when installed as per the test configuration therefore satisfies the requirements of BS EN 60529:1992+A2:2013, IPX5.

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Vicon Valkyrie regulatory, safety and warranty information
 \ Vicon Valkyrie IP certification \

Test certificate no: TRA057445CC04 - Ingress Protection



Test Certificate

CERTIFICATE No: TRA057445CC04
ISSUE: A
DATE: 11/01/2023

PURPOSE OF TEST: Ingress Protection
CLIENT ORDER No: POR015275
CLIENT: Vicon Motion Systems Ltd, Unit 6 Oxford Industrial Park,
Mead Road, Yarnton, OXFORD, GB. OX5 1QU.

EQUIPMENT UNDER TEST:
EUT Name: Valkyrie_Camera-MECH-ASY (BLACK_RF Window+Blk Orings)
Part Number: BLY001AA_1
Stores Number: TRA-057445-S12
Receipt date: 19/12/2022
EUT Name: Valkyrie_Camera-MECH-ASY (SILVER_2127 Window+Nyseal)
Part Number: BLY001AA_2
Stores Number: TRA-057445-S13
Receipt date: 19/12/2022

TEST SPECIFICATIONS: In accordance with quotation TRA-057445-07 and BS EN 60529:1992+A2:2013, IPX5.

TEST DATE: 19/12/2022

TEST LOCATION: Element Materials Technology, Rothwell Road, Warwick, Warwickshire, CV34 5JX

WRITTEN BY:

Richard Heath
Environmental Test Engineer

APPROVED BY:

Rob Sutton
Verification Controller

The results herein relate only to the particular samples of equipment tested and the specific tests performed, as detailed above, and in accordance with the contract. Full details of test results, modifications and marginal results are held by Element Materials Technology Warwick Ltd. This laboratory is accredited in accordance with the recognised International Standard ISO/IEC 17025. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF communiqué dated April 2017). No representation or warranty is given that the tests performed under the terms of contract constitute, in themselves, a sufficient programme for the client's purpose, nor that the client's equipment is suitable for any particular purpose, nor that any approval has or will be granted by Element Materials Technology Warwick Ltd or any other body. The contents of this certificate shall not be reproduced, except in full, without the written approval of Element Materials Technology Warwick Ltd.

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Vicon Valkyrie regulatory, safety and warranty information (Vicon Valkyrie IP certification)



CERTIFICATE No: TRA057445CC04
ISSUE: A
DATE: 11/01/2023

TESTS CARRIED OUT:

IPX5 – Protected Against Water Jets

Nozzle: 6.3 mm diameter
Flow Rate: 12.5 litres per minute \pm 5%
Duration: 1 minute per m² of surface area of enclosure from all practicable directions (3 minutes minimum)
Distance: 2.5 to 3 metres
Water Temperature: Within \pm 5 °C of specimen temperature

The temperature of the water and the specimens was measured to ensure the differential was within 5°C. The specimens were mounted individually, in their normal operating orientation and sprayed from all practicable directions for a period of 3 minutes each, in accordance with the specification.

TESTS RESULTS:

IPX5 – Protected Against Water Jets

After testing, specimen TRA-057445-S12 was dried externally before being opened for internal inspection. No water ingress was found.

After testing, specimen TRA-057445-S13 was dried externally before being opened for internal inspection. Water ingress was noted but was deemed insufficient to interfere with satisfactory operation of the specimen or to impair safety.

Specimens TRA-057445-S12 and TRA-057445-S13 when installed as per the test configurations therefore satisfy the requirements of BS EN 60529:1992+A2:2013, IPX5.



Vicon Valkyrie regulatory, safety and warranty information
 \ Vicon Valkyrie LED Product Classification \

Vicon Valkyrie LED Product Classification

Vicon Valkyrie has been tested for conformity to the requirements of BS EN 62471:2008 (Photobiological Safety of Lamps and Lamp Systems) and IEC PD/TR 62471-2:2009.

Note that the product has been found to meet the accessible radiation limits required for a RISK GROUP EXEMPT (RG0) PRODUCT.



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**LED PRODUCT CLASSIFICATION TO
BS EN 62471:2008 & IEC PD/TR 62471-2:2009**

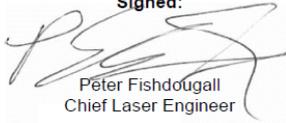
Date: 15th February 2023

SAMPLE NAME: Valkyrie Motion Capture Camera
SERIAL NUMBER: VIC-26-0041
MANUFACTURE: Vicon Motion Systems Ltd
6 Oxford Industrial Park
Mead Road
Yarnton
OX5 1QU
Great Britain

CERTIFICATE NUMBER: 2576
RISK GROUP AWARDED: RISK GROUP EXEMPT (RG0)

CERTIFICATION

We hereby certify that this sample has been rigorously tested by us for conformity to the requirements of BS EN 62471:2008 under all operating, maintenance conditions and found to meet the accessible radiation limits required for a **RISK GROUP EXEMPT (RG0) PRODUCT**. The sample complies with all the user information, labelling and engineering requirements as per IEC PD/TR 62471-2:2009. This Classification certificate only refers to the Model and Serial number tested.

Signed:

Peter Fishdougall
Chief Laser Engineer

Safety information

To avoid introducing a safety hazard and possibly damaging the system, please ensure that an adequate and good-quality alternating current (AC) power source is available. Please refer to the ratings statement on the rear of the relevant Vicon-supplied Ethernet switch for guidance. Also ensure that any computers and peripheral devices are set to be electrically rated to operate with the AC power available in your location.

When working with Vicon Valkyrie systems, observe these safety precautions:

- To prevent electric shock, plug all system components into properly grounded power sources. These cables must be equipped with three-prong plugs to ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a cable.
- Ensure nothing rests on the system cables and that cables are not located where they can be stepped on or tripped over.
- Do not touch the Ethernet switch and the patient simultaneously.
- If cameras are mounted where they may fall and injure people or damage equipment, tether them to their mounts with safety bonds.
- Do not spill food or liquids onto any electrical component of the system. If any component gets wet, immediately contact Vicon Motion Systems or your nearest agent or distributor for advice.
- Do not push any objects into the slots of any unit of the system. Doing so can cause fire or electric shock by shorting out internal components.
- Keep all system components away from radiators and heat sources, and do not block cooling vents. Avoid placing loose papers beneath components. Do not place any components on closed-in units or on a bed, chair, etc.
- Replace fuses with the same type and rating for continued fire protection.
- Do not use outside, near water, in an environment exposed to anesthetic or other explosive gases, or in mobile applications.
- Use only hypoallergenic tape to affix Vicon markers to a subject's skin. Vicon supplies specially designed marker fixing tape; medical grade elastic strips are also suitable.
- Do not apply any products containing latex to the subject while using the Vicon system. Vicon products do not contain latex.
- Do not look directly at the source when a Near Infrared (NIR) strobe unit (which may be present if Valkyrie cameras are part of a mixed system with other older Vicon cameras) or Infrared (IR) strobe unit is in operation and note the following warnings.

Vicon Valkyrie regulatory, safety and warranty information
 \ Safety information \



Caution

Although it is theoretically possible for a strobe single fault condition to fully on to occur when an operator's eyes are within 100 mm of the Light Emitting Diodes for longer than 17 seconds, the likelihood of any such failure resulting in an emission of light that exceeds the Maximum Permissible Exposure defined by standard BS EN 62471:2008 (Photobiological Safety of Lamps and Lamp Systems) to infrared light is extremely unlikely in practice, due to the design of the product.



Warning

Under abnormal usage conditions, the Maximum Permissible Exposure defined by standard BS EN 62471:2008 (Photobiological Safety of Lamps and Lamp Systems) to infrared light may be exceeded if your eyes are within 100 mm of the Light Emitting Diodes for longer than 400 seconds.

Vicon Valkyrie regulatory, safety and warranty information
 \ Warranty information\

Warranty information

The warranty for your Vicon Valkyrie system begins after installation.

For full details on warranty scope and conditions, refer to the Vicon Terms and Conditions of supply for your Vicon Valkyrie system.

Further resources

Further resources

If you need more information than that supplied in the documentation or on the [Vicon Support web pages](https://www.vicon.com/support)³⁰, please contact Vicon:

Denver, CO

Vicon Denver
12650 E Arapahoe Rd
Suite 200, Centennial
CO 80112, USA
T: 303.799.8686
F: 303.799.8690
E: support@vicon.com

Los Angeles, CA

Vicon LA
3750 S. Robertson Boulevard
Suite 100, Culver City, Los Angeles
CA 90232, USA
T: 310.437.4499
E: support@vicon.com

Oxford, UK

Vicon Oxford
Unit 6, Oxford Pioneer Park
Mead Rd, Yarnton, Oxford
OX5 1QU, United Kingdom
T: +44.1865.261800
E: support@vicon.com

³⁰ <https://www.vicon.com/support>