Odyssey by Teradek

Rugged Mobile H.264 Network Video Codecs

The Odyssey Family of Codecs

Teradek's Odyssey family are the world's most advanced H.264 network video codecs. The Odyssey line includes three encoders, and two companion codecs. The Odyssey encoders are unique in their ability to encode virtually every video input, and any resolution in the world today. Odyssey's 1080p60 HD capable video provides startling clarity and resolution, with extremely low network bandwidth requirements and low latency.

Variety of Models

- **1HDe5:** 1ch HD Encoder : 5 wire component in RGB+HV
- **1HDe3:** 1ch HD Encoder : 3 wire component in RGB, Sync on green
- **1HDc:** 1ch HD Codec : 1HDMI in, 1 HDMI out
- **4SDe:** 4ch SD Encoder : 4 composite SD in, 1 composite SD out
- **1SDc:** 1ch SD Codec :1 composite SD in, 1 composite SD out

Industrial Strength and Mission Critical

Odyssey is rugged, with a wall mountable aluminum case with a small footprint, no moving parts, and an embedded operating system designed for mission critical reliability. Odyssey's hardware compression provides the highest performance at lowest power consumption. In fact, the compete design is optimized for energy efficiency, allowing units to be deployed in harsh environments like airborne or remote locations. Odyssey can use either Power over Ethernet (PoE), or DC power, or both as redundant failover power sources to further increase reliability. Installation and operation are simple and intuitive.

Applications

- Surveillance
- Law Enforcement
- Defense
- Mobile Video Applications
- Digital Signage
- Broadcast Distribution
- Point to Point
- Video Conferencing
- Automotive Infotainment
- Education
- Home Theater
- ...and More

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Video Input

HDMI Input

Resolutions up to 1080p60 with stereo audio are supported on the HDMI input. The 1080p60 stream is encoded as 1080p30 for optimum network bandwidth usage. Note that copyrighted materials that enable HDCP protection can not be encoded and streamed by Odyssey.

SD BNC Video Input

SD models feature 1 or 4 BNC composite video inputs, terminated in 75 Ohm.

Video Output

HDMI Output

The HDMI output provides up to 1080i60 or 720p resolution with stereo output. Odyssey uses EDID v1.3 to auto negotiate the optimum resolution for your monitor.

SD BNC Video Output

All Odyssey models feature a composite SD BNC video output. The video output can be configured to display the live video (spot monitor), remote video, or for video playback. The audio output is amplified and can be connected directly to headphones or powered speakers.

Supported Video Input Resolutions

Video Input Modes

Four distinct Video Input modes are available when Odyssey is configured as an Encoder: Composite, HDMI, Component (YUV) and Component (RGB). Each of these separate modes has a range of resolutions available supporting most video and graphics signals available, be it for broadcast, computer graphics, or surveillance applications. The list of compatible resolutions based on the mode is shown below.

Resolution Video Input Mode	480i	576i	720p	1080i	1080p24 1080p30 1080p60	1280x1024p60 1024x768p60 800x600p60
Composite	✓	✓				
HDMI			✓	✓	✓	✓
Component (YUV)			✓	✓		
Component (RGB)	✓		✓ (3,4,5 wire sync)	✓ (3,4,5 wire sync)	✓ (3,4,5 wire sync)	✓ (3,4,5 wire sync)

Audio Input

HDMI 3.1 Stereo Audio Input

Audio from HD video sources are input as 3.1 stereo via the HDMI connector.

SD Line Level Audio Input

Odyssey features a terminal block for connecting 1 to 4 audio inputs, operating at line level.

Audio Input Mode & Sample Rate

Odyssey's audio input mode can be configured as Disabled, Analog, or HDMI. Depending on the Audio Input Mode, the Audio Input Sample Rate can be configured as 16, 44.1, or 48kHz

Audio Output

HDMI 3.1 Stereo Audio Output

Audio from HD video sources are output as 3.1 stereo via the HDMI connector.

SD Line Level Audio Output

Odyssey features a 3.5mm audio jack for outputting line-level analog stereo audio.

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Codec Overview

Video Codec SoC

Odyssey is designed around the world's premier video codec SoC chip; Maxim's Mobilygen MG3500 Hardware Codec SoC. The MG3500 integrates an HD H.264/MPEG2/MJEPG codec with an ARM9 processor along with several other peripherals.

High Profile (Level 4.1) H.264 Compression/ Decompression

Level 4.1 H.264 is an advanced compression algorithm providing a 2:1 reduction in bit rates with equal image quality when compared to MPEG2. Odyssey provides High Profile compression/decompression of video signals for Blu-Ray quality video over IP. Odyssey can also encode/decode MJPEG, or a second H.264 stream of the same video input for lower bit rate applications (dual streaming). Finally, Odyssey offers MPEG2 decode capability, that could also be use to transcode MPEG2 to H.264.

Flexible Encoding/Decoding Capabilities

Odyssey's 4ch SD codec is capable of encoding and streaming (or decoding) 150FPS of full D1, DVD quality video with audio. This equates to four channels of 30FPS SD D1, and 4 channels of CIF encoded simultaneously. The HD codec is capable of accepting up to 1080p60 input signals, encoding and streaming (or decoding) one channel at up 30FPS.

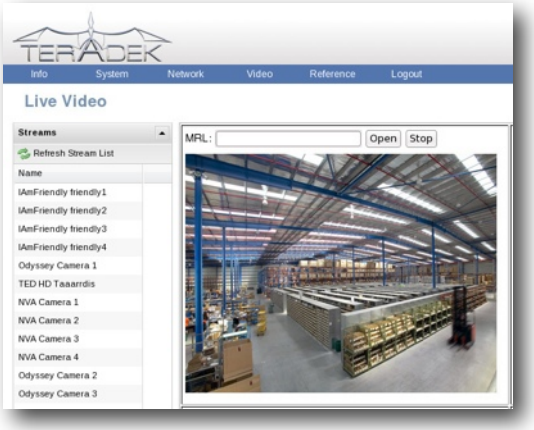
Display Capabilities

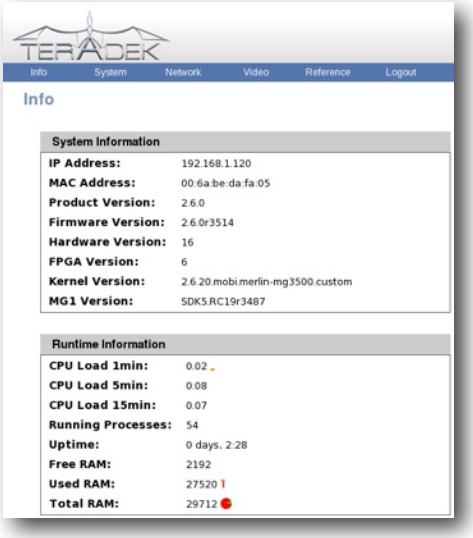
Depending on the model, Odyssey can display 1-4 local or remote video feeds on either SD or HD output. IP video streams can originate from various locations. Since Odyssey has a powerful built in scaling and compositing engine, the display can show local or remote video content, on the local HD or SD monitor outputs, regardless of the original resolution.

Web User Interface

Control Via WebUI

Odyssey's WebUI is simple yet sophisticated allowing the user to easily configure the unit, name video streams, watch live or recorded video, and much more. The WebUI supports automatic discovery, configuration and control of multiple units from a single UI. Users do not need to interact with IP addresses, since the units automatically use friendly names to hide the network specifics. All that is needed is any standard web browser, on any connected network location. No additional software clients are needed on the PC, Mac, or Linux machine. Remote upgrade for the firmware is also available through the built in web interface.





Odyssey's WebUI is elegant and easy to use.

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Network

Network Capabilities

Odyssey features 10/100/1000 Ethernet, with POE and includes an advanced built-in web server and network infrastructure that automatically configures, discovers and pairs with other Teradek devices independent of network infrastructure, thereby greatly simplifying installation and use. Odyssey supports Multiple Unicast and Multicast capabilities allowing optimal network bandwidth usage for multiple clients. Discovery and control of your devices are simple and intuitive using IP0Config and UPnP.

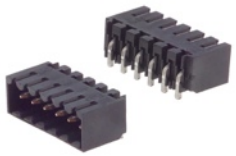
Network

- **Ethernet:** 10/100/1000 Base-T
- **Ethernet Protocols:** TCP/IP, UDP, HTTP, DHCP, NTP, RTP, RTSP, SSL
- **Advanced built-in web server**
- **Feature-rich, advanced WebUI**
- **Bit Rate:** 1-5 Mbps or 4-20 Mbps

Connector Pin Outs

Terminal Block

There are three 6-pin Terminal blocks on the I/O side of the board next to the USB and Ethernet ports. A 3.5mm size Terminal block was selected for the small size and availability of a mating screw clamp module.



Terminal Block 1

Pin Name	Group	Function
RS232RX	RS232	Serial Commutations Receive
RS232TX	RS232	Serial Commutations Transmit
GND	RS232	Serial Communications Ground
General Purpose Input 1	Input	Alarm Input 1
GND	Input	Alarm Input Ground pin
General Purpose Input 2	Input	Alarm Input 2

Terminal Block 1

Pin Name	Group	Function
ADC Input	Input	Analog Input (Supervised input)
GND	Input	
RS485B/RS422RXB	RS485/422	RS485 transmit / receive differential signals. In RS422 mode these 2 pins are the receiving differential signals
RS485A/RS422RXA	RS485/422	
RS422TXB	RS485/422	RS422 Transmit differential signals.
RS422TXA	RS485/422	

Connector Pin Outs Continued

Terminal Block 2

Pin Name	Group	Function
ADC Input	Input	Analog Input (Supervised input)
GND	Input	
RS485B/RS422RXB	RS485/422	RS485 transmit / receive differential signals. In RS422 mode these 2 pins are the receiving differential signals
RS485A/RS422RXA	RS485/422	
RS422TXB	RS485/422	RS422 Transmit differential signals.
RS422TXA	RS485/422	

Terminal Block 3

Pin Name	**Group**	**Function**
Alarm In 4	Alarm	Alarm Input 4
GND	Alarm	Alarm Input Ground
Alarm In 3	Alarm	Alarm Input 3
Alarm In 2	Alarm	Alarm Input 2
GND	Alarm	Alarm Input Ground
Alarm In 1	Alarm	Alarm Input 1

Power

Power

There is a single 2-pin Terminal block on the I/O side of the board next to the I/O Terminal Blocks. A 5mm size Terminal block was selected to prevent accidental connection of power to I/O signals.

Pin Name	**Group**	**Function**
+VIN	DC Power	DC voltage input. +9v to +48V max
GND	DC Power	Power input ground

Analog Audio/Video I/O

A standard 2.54mm Header is used to as the SD video I/O. This allows product specific boards to be used for the defined interface. The interface has the following I/Os:

J2

Pin Name	Group	Function
Video Out	Output	Composite Video Output
GND	Output	Ground
Audio Out L	Output	Audio Output L
Audio Out R	Output	Audio Output R
Video In 1	Input	Composite Video 1 IN / Component R In
GND	Input	Ground
Video In 2	Input	Composite Video 2 IN / Component G In (SOG)
GND	Input	Ground
Video In 3	Input	Composite Video 3 IN / Component B In
GND	Input	Ground
Video In 4	Input	Composite Video 4 IN
+5.0V	Power	+5V power for daughter board
Audio In 1	Input	Audio Input 1
Audio In 2	Input	Audio Input 2
Audio In 3	Input	Audio Input 3
Audio in 4	Input	Audio Input 4
VSYNC	Input	Component VSYNC
HSYNC	Input	Component HSYNC
SCK*	I2C	I2C clock
SDA*	I2C	I2C data

Common Specifications

Interfaces

- Point to Point, Multiple Unicast, Multicast
- USB 2.0: 2 Powered
- RS485, RS422, RS232: 1 ea.
- Alarm Inputs: 4
- PTZ & POS Integration
- Wifi/GPS/GSM Connectivity: Contact Teradek for list of tested peripherals.

Environmental

- Temperature: 0 to +50 C
- Humidity: 95% non condensing

Physical

- Dimensions: 6.2"W x 5.7" D x 1.2" H
- Weight: Approx. 1 lb.
- Nominal Power Consumption: 7.5W
- PoE: 802.3af Compliant
- Auxiliary Power Input: 9-40V DC
- EMC Emission: EN 55022, FCC Ch 15 Subpart B
- EMC Immunity: EN 55024

Encoder Specifications

Encoder Specifications

- Compression Algorithm: High Profile H.264 (L4.1), MJPEG
- Compression Rate: 30FPS down to 1FPS Per Stream
- Resolution: HD (1920 x 1080), Full D1, CIF
- Audio Compression: AAC, MP2

Per Channel Encoder Settings

- Burn-in text: Camera title, timestamp
- Bitrate: (SD: 256k-4M, HD: 4M-10M)
- Resolution: D1, (CIF, QCIF for v3.0)
- Frame Rate (NTSC): 30, 25, 20, 15, 10, 5, 3, 2, 1
- Frame Rate (PAL): 25, 12, 6, 3, 2, 1
- GOP (1-256)
- Associate audio output with channel in LIVE preview

Decoder Specifications

Decoder Specifications

- Decode Algorithm: H.264 High Profile (L4.1), MPEG2, MJPEG
- No. Channels Decoded: 1 HD or 6 D1 or 24 CIF
- RTP Decoding

Decoder Settings

- Associate audio output with channel on video output
- Manual configuration or Drag and Drop configuration with Service Discovery
- Automatic decoder configuration from encoder advertisement

Web Server Features

Streaming

- RTP Track name configuration
- RTSP port configuration
- Multicast (IP Address, video port, audio port)
- Standard RTP/RTSP compliant streams (tested with VLC)

ZeroConf

- Friendly name configuration
- mDNS (Bonjour)
- Web server advertisement
- Stream advertisements
- UPnP advertisement [TBD in 3.0]

Web Server

- HTTP Port configuration
- SSL encryption
- Multiple connections

Network

- Burn-in MAC address
- Hostname configuration
- Dynamic IP address with DHCP
- Static IP Address (IP address, subnet, gateway, name server)
- Change network settings on the fly without restarting

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WebUI Features

Webpage
- Cross browser compliant (HTML, CSS, Javascript)
- Dynamic web content
- Password protected
- Password management
- Session login and logout
- System Information (Versions)
- Runtime Information (CPU, memory)
- System Reboot

Firmware Upgrade
- Webpage based firmware upgrade
- Version checking
- Firmware image verification
- FPGA firmware upgrade

User Settings
- Consistent data across multiple views
- Persistent storage of user settings over power cycle
- Persistent user settings over firmware upgrade
- Import user settings from file (USB)
- Export user settings to file (USB)
- Factory reset (with or without preserving network settings)
- Error checking when user settings are changed
- User permission checking [TBD in 3.0]

Interfaces

Interfaces Overview
- Point to Point, Multiple Unicast, Multicast
- USB 2.0: 2 Powered
- RS485, RS422, RS232: 1 ea.
- Alarm Inputs: 4
- PTZ & POS Integration
- Wifi/GPS/GSM Connectivity: Contact Teradek for list of tested peripherals.

USB

Odyssey features two powered USB 2.0 ports. These ports are used for recording video to USB mass media devices. Users can also save Odyssey's configuration to a USB device for backup or for replicating the configuration to other Odyssey units.

The USB connectors are 2 stacked USB Type A connectors on the edge.

Cat5 RJ45 Ethernet Connections

Ethernet connection is made via a standard Cat5 RJ45. LED indicators are present on the network connector to indicate network link speed and network activity.

LED Function Indicators

Amber
- Flashing for network activity.

Green
- Off: 10 Mbit (Ethernet) or 1000 Mbit (Gigabit) connection
- On: 100 Mbit (Fast Ethernet) connection

Signal Inputs

There are four signal inputs that can be used as alarms or event triggers. Each input is level adjusted and debounced.

Serial Port
- Configuration: Baud rate, Data bit, Parity, Stop bit
- Mode: RS232 and RS485
- Passthrough: Serial Port loop through
- Passthrough: Network server and client

PoE

A PoE module is included to power the device over the Ethernet cable.

Support

Documentation

Odyssey is well supported with documentation including a manual plus model specific quick start guides and spec sheets.

1HDe3 Specifications

Video

- **Input:** 1 Channel HD, up to 1080i60/50, Sync on Green
- **Connector:** 3 BNC
- **Monitor Output:** 1 Channel 480p60/525p50
- **Output Connector:** BNC

Audio

- **Channels:** 1 Stereo or 2 Mono
- **Connector:** Terminal Block
- **Audio Outputs:** 3.5mm audio jack

Codec

- **Compression Algorithm:** High Profile H.264 (L4.1), MJPEG
- **Compression Rate:** 30FPS down to 1FPS
- **Resolution:** HD (1920 x 1080), Full D1, CIF
- **Audio Compression:** AAC, MP2

Network

- **Ethernet:** 10/100/1000 Base-T
- **Ethernet Protocols:** TCP/IP, UDP, HTTP, DHCP, NTP, RTP, RTSP, SSL
- **Advanced built-in web server**
- **Feature-rich, advanced WebUI**
- **Bit Rate:** 4 Mbps to 20 Mbps

1HDe5 Specifications

Video

- **Input:** 1 Channel HD, up to 1080i60/50
- **Connector:** 5 BNC, RGB HsVs, or YPbPr HsVs
- **Monitor Output:** 1 Channel 480p60/525p50
- **Output Connector:** BNC

Audio

- **Channels:** 1 Stereo or 2 Mono
- **Connector:** Terminal Block
- **Audio Outputs:** HDMI & 3.5mm audio jack

Codec

- **Compression Algorithm:** High Profile H.264 (L4.1), MJPEG
- **Compression Rate:** 30FPS down to 1FPS
- **Resolution:** HD (1920 x 1080), Full D1, CIF
- **Audio Compression:** AAC, MP2

Network

- **Ethernet:** 10/100/1000 Base-T
- **Ethernet Protocols:** TCP/IP, UDP, HTTP, DHCP, NTP, RTP, RTSP, SSL
- **Advanced built-in web server**
- **Feature-rich, advanced WebUI**
- **Bit Rate:** 4 Mbps to 20 Mbps

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1SDc Specifications

Video

- **Input**: 1 Channel SD 480p60/525p50
- **Input Connector:** BNC
- **Monitor Output:** 1 Channel SD 480p60/525p50
- **Output Connector**: BNC

Audio

- **Channels:** 1 Stereo or 2 Mono
- **Input Connector:** 3.5mm audio jack
- **Audio Outputs:** 3.5mm audio jack

Codec

- **Compression Algorithm:** High Profile H.264 (L4.1), MJPEG
- **Compression Rate:** 30FPS down to 1FPS
- **Resolution:** Full D1, CIF
- **Audio Compression:** AAC, MP2
- **Decode Algorithm:** H.264 High Profile (L4.1), MPEG2, MJPEG
- **No. Channels Decoded:** 4 D1 or 24 CIF

Network

- **Ethernet:** 10/100/1000 Base-T
- **Ethernet Protocols:** TCP/IP, UDP, HTTP, DHCP, NTP, RTP, RTSP, SSL
- **Advanced built-in web server**
- **Feature-rich, advanced WebUI**
- **Bit Rate:** 64 Kbps to 5 Mbps

4SDe Specifications

Video

- **Input**: 4 Channel x 30FPS SD 480p60/525p50
- **Input Connector:** 4x BNC
- **Monitor Output:** 1 Channel SD 480p60/525p50 Full Screen or 2x2
- **Output Connector**: BNC

Audio

- **Channels:** 4 Mono
- **Input Connector:** Terminal Block
- **Audio Outputs:** 3.5mm audio jack

Codec

- **Compression Algorithm:** High Profile H.264 (L4.1), MJPEG
- **Compression Rate:** 30FPS down to 1FPS
- **Resolution:** Full D1, CIF
- **Audio Compression:** AAC, MP2
- **Decode Algorithm:** H.264 High Profile (L4.1), MPEG2, MJPEG
- **No. Channels Decoded:** 4 D1 or 24 CIF

Network

- **Ethernet:** 10/100/1000 Base-T
- **Ethernet Protocols:** TCP/IP, UDP, HTTP, DHCP, NTP, RTP, RTSP, SSL
- **Advanced built-in web server**
- **Feature-rich, advanced WebUI**
- **Bit Rate:** 64 Kbps to 5 Mbps

TERADEK

1HDc Specifications

Video

- **Input**: 1 Channel HD, up to 1080p60/50
- **Connector**: HDMI/DVI Input
- **HD Monitor Output**: 1 Channel HD 1080i60/50
- **Output Connector**: 1 HDMI/DVI, 1 BNC

Audio

- **Channels:** 3.1 Stereo
- **Connector:** HDMI
- **Audio Outputs:** HDMI & 3.5mm audio jack

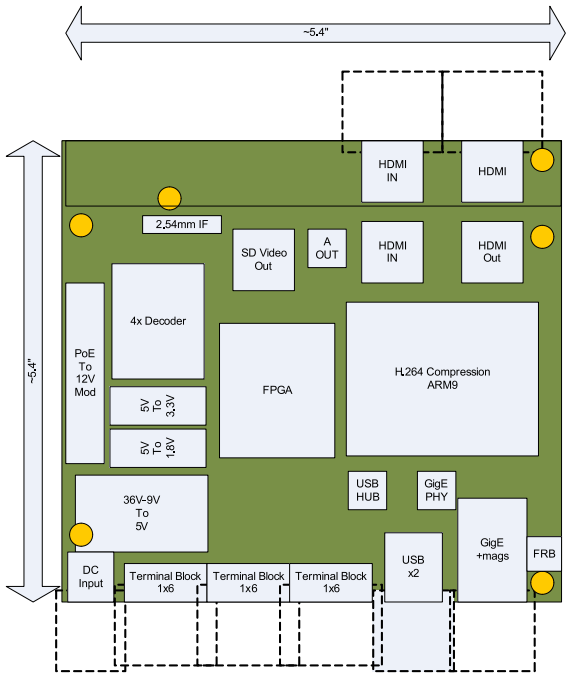
Codec

- **Compression Algorithm:** High Profile H.264 (L4.1), MJPEG
- **Compression Rate:** 30FPS down to 1FPS Per Stream
- **Resolution:** HD (1920 x 1080), Full D1, CIF
- **Audio Compression:** AAC, MP2
- **Decode Algorithm:** H.264 High Profile (L4.1), MPEG2, MJPEG
- **No. Channels Decoded:** 1 HD or 6 D1 or 24 CIF

Network

- **Ethernet:** 10/100/1000 Base-T
- **Ethernet Protocols:** TCP/IP, UDP, HTTP, DHCP, NTP, RTP, RTSP, SSL
- **Advanced built-in web server**
- **Feature-rich, advanced WebUI**
- **Bit Rate:** 4 to 20 Mbps

PCB Layout



Development Notice

Due to ongoing developments and improvements, all specifications are preliminary and subject to change. All certifications are pending.

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Input Output Pathway Diagram