BirdDog | FLEX IN

THE SMALLEST 4K NDI ON THE PLANET.

USER GUIDE
September 2022

NDI

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Important Information

Legal Notice

To ensure account security, please change the password after your first log in. You are recommended to set a strong password (no less than eight characters).

The contents of this document are subject to change without prior notice. Updates will be added to the new version of this manual. We will readily improve or update the products or procedures described in the manual.

Best effort has been made to verify the integrity and correctness of the contents in this document, but no statement, information, or recommendation in this manual shall constitute formal guarantee of any kind, expressed or implied. We shall not be held responsible for any technical or typographical errors in this manual.

The product appearance shown in this manual is for reference only and may be different from the actual appearance of your device.

Due to uncertainties such as physical environment, discrepancy may exist between the actual values and reference values provided in this manual.

Use of this document and the subsequent results shall be entirely on the user's own responsibility.

Regulatory Compliance

FCC Part 15

This equipment has been tested and found to comply with the limits for digital device, pursuant to part 15 of the FCC Rules. 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.

This product complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

LVD/EMC Directive

This product complies with the European Low Voltage Directive 2006/95/EC and EMC Directive 2004/108/EC.

Welcome to BirdDog!

Thank you for purchasing your 4K FLEX IN/BACKPACK Converter. If you have any questions regarding the unit, please contact your authorized dealer.

Using This Manual

Your 4K Converter is a powerful and sophisticated device, so please read this manual before use and retain for future reference.

Tip
When viewing the diagrams in this manual, use the zoom controls in your browser or PDF reader to reveal more detail.

First Step

Firmware Upgrade
Before you use your new converter, it's a good idea to upgrade to the latest firmware. We are always adding new features and improving the performance of our products, so installing the latest firmware will provide you with the best user experience.

To upgrade the firmware, please follow the **Firmware Upgrade Instructions** located in your firmware download folder and perform upgrade process.

The latest firmware files are available for download here.

We're Invested in Your Success

We pride ourselves on being approachable and easily contactable. We'd love to hear from you.

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Co–Founder and CEO	Co–Founder and CMO
dan@bird–dog.tv	eamon@bird–dog.tv

Welcome to the Future

What is NDI®?

Your new camera has been designed to support the cutting edge NDI® video transmission standard.

NDI® (Network Device Interface) is a high-quality, low-latency, frame-accurate standard that enables compatible devices to communicate, and deliver and receive high definition video over your existing Gigabit Ethernet network.

Operating bi-directionally, NDI® devices can be auto-detected, powered and controlled over the same Ethernet cable used to send the video and audio. If you have a Gigabit network, you have the potential for a streamlined, interconnected, video production environment.

With the introduction of NDI® 5, you can now securely share network sources between remote sites anywhere in the world – on a single network port. Even a smartphone can be a NDI® source.

Transitioning to NDI® can also occur gradually. Existing SDI or HDMI signals can easily be converted to an NDI® stream and piped where required on your network and converted back only at the necessary endpoints.

BirdDog has been on the NDI® journey since the very beginning, and your camera is just one of our products designed to take advantage of the features and potential of NDI®.

For more information on NDI®, please refer to this page on our website.
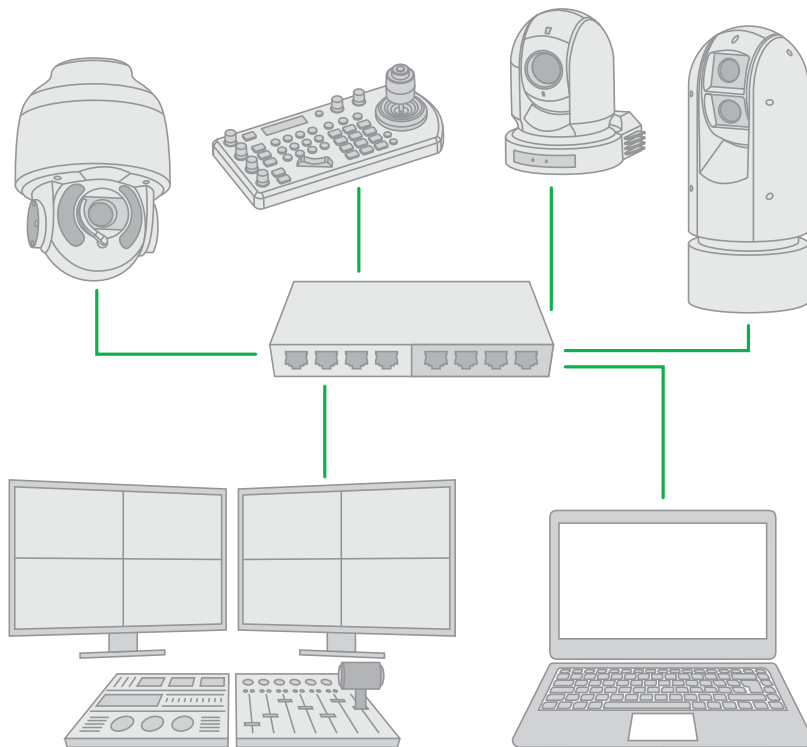
Getting to Know Your Converter

Thanks for purchasing your BirdDog 4K Converter. Please take some time to read this document to allow you to get the most out of your purchase and familiarize yourself with the features available in the unit.

Physical Connectors

HEADPHONES — RS232

HALO TALLY

PoE/NDI — HDMI IN
DC IN — DC OUT
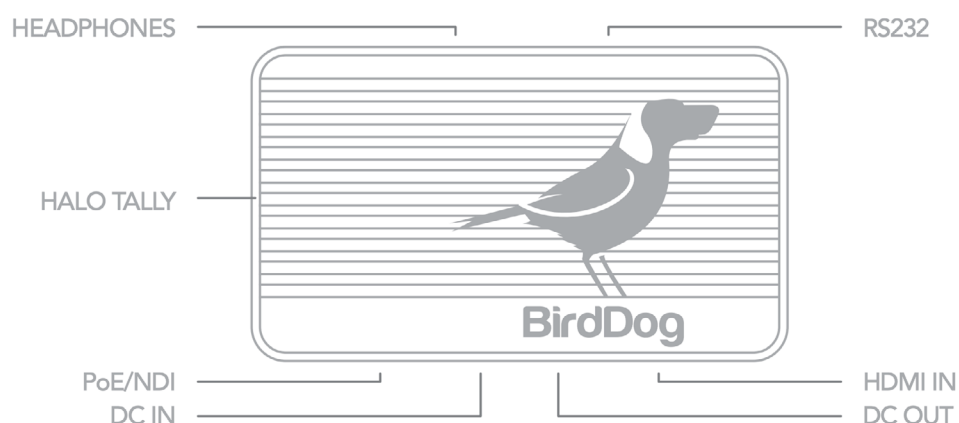
Powering Your Converter

This converter is equipped with a sophisticated system allowing power from various sources:

PoE+ (Power over Ethernet)

PoE+ is a convenient way to power this converter as it allows both data and power to be sent through the same standard Ethernet cable. To take advantage of PoE+, the network switch that the converter is directly plugged into must support PoE+(802.11at).

Different network switches are capable of providing differing amounts of total power to all connected devices. This FLEX 4K converter uses approximately 14 watts in PoE+ mode to operate on its own, and up to 30w when powering additional equipment.

DC In

Located at the side of the 4K converter is a DC connection port. This power input socket is capable of accepting 12v DC power.

DC Out

Located at the side of the FLEX 4K converter is a DC Out connection port. This power outlet socket is capable of delivering 12v DC power at up to 15w to power external equipment. Please note that if your external equipment draws more than 15w the FLEX 4K unit will power off automatically.

NP–Style Battery Plate (4K BACKPACK Only)

The BirdDog FLEX 4K BACKPACK features a NP–style battery plate that allows you to mount the BirdDog FLEX BACKPACK to another piece of equipment. The NP–style plate is designed to work with most equipment but may not be possible to connect to all devices owing to physical constraints. Please note the NP–style DV output voltage is 12v DC.

IMPORTANT NOTE WHEN POWERING EXTERNAL DEVICES

BirdDog FLEX 4K and FLEX 4K Backpack deliver 12v DC outputs which can be used for various purposes from powering cameras to screens to external recorders. No warranty is given for the use of this feature with regards to the suitability of your third-party equipment. It is advised that you should carefully check the user guide of the equipment you wish to power to ensure it is capable of accepting 12v DC input and if there are any warranty implications for using 3rd party power sources.

Thermal Management

This product has been engineered to be actively cooled. In order to achieve best thermal performance, the fan assembly has been carefully designed to provide optimum cooling while remaining extremely quiet. It is normal for warm air to pass through the vent voutlets. The main processor is capable of operating up to 100° C / 212° F.

Operating Your Converter

Boot Up

When FLEX is booted, the Halo Tally light will illuminate orange and the network activity indicator will begin to flash indicating that the device's detection of the computer network. After approx. 20 seconds, the Halo Tally will flash Red and then Green, indicating the unit is completely booted and ready for operation.

Web Configuration Panel

In this release, the web configuration panel (Web UI) allows you to alter key settings of your converter, specifically A/V settings, and video frame rates, restarting the video processing engine, changing networking parameters and applying firmware updates.

Access via a Web Browser (URL)

To access the web configuration panel please point your computer web browser to: http://birddog-xxxxx.local/ "xxxxx" is the serial number of the converter, the serial number is printed on the box and on the main unit. Note the web address is case sensitive and all lower case. Your computer will need to have 'Bonjour' services loaded in order to access the unit as described above. Apple devices come pre-installed with Bonjour, while Windows devices need a small plugin available here.

Access via IP Address

Your converter is configured to automatically receive a network IP address from the computer network via DHCP (Dynamic Host Configuration Protocol). Most corporate, education and home networks have a DHCP server present on the network to allow this to occur. Usually your Internet Router provides this.

If your device receives an IP address automatically from this server (DHCP) the IP address can be discovered in several ways, including BirdDog Central Lite available from here.

Access Without a Network DHCP Server

Some standalone or private networks may not have a DHCP server. After 30 seconds of waiting for an automatically assigned IP address, the device will fall back to a default address which is: **192.168.100.100.**

In order to access the web configuration panel on a network which is configured to a different subnet, change your computers IP address to match the BirdDog unit's IP address range. Once you gain access to the BirdDog web configuration panel choose your IP address to match the rest of the devices on your network.

For instructions on setting your computers IP address, please consult your computer operating system manual or IT support resources.

Password Management

Once you direct your web browser to the web configuration panel you will need to log in to change any settings.
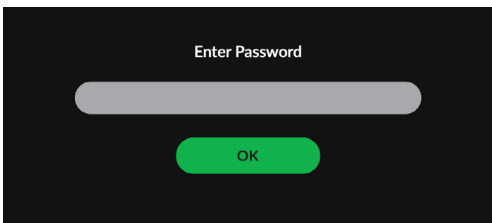
Default Password

The web configuration panel is secured by a user–selectable password. The default password is:

birddog (one word, lower case).

To change the password, simply log in using the default password, navigate to the network tab in the web interface, and select change password.

It is recommended to change this password in a network environment where your device is shared with other users (e.g. not private), since this password grants full access to the configuration settings and could interrupt a live program.

Dashboard

The Dashboard summarizes the important settings for the converter in one convenient location. You can also reboot the device or restart the video processing engine.

Reboot Device

Click this button to reboot the unit after changing key network settings or the BirdDog name.

Restart Video

Click this button to restart the NDI® stream. This may be necessary after changing key image settings e.g., resolution.
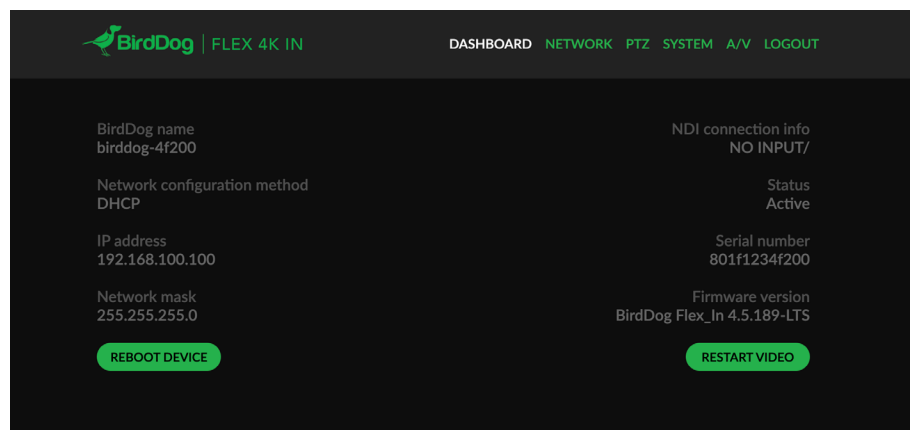
Network

Most computer networks provide for both automatic and manual configuration of network devices and FLEX can accommodate both.

Configuration Method

Here you can set the network configuration to either DHCP (default) or Static. DHCP simplifies the management of IP addresses on networks. No two hosts can have the same IP address, so assigning them manually can potentially lead to errors. If your network is set up for DHCP, this is generally the best configuration to choose.

If you do choose to go with a Static IP address, you'll need to add the IP Address, Subnet Mask and Gateway Address information according to the requirements of your network.

DHCP Timeout, Fallback IP address, Fallback Subnet Mask

You can set the timeout period during which FLEX will look for a DHCP IP address. After this period, the camera will default to the designated fallback IP address.

This can be useful if you use your camera in other network environments. For example, if a DHCP server is available in your normal office or studio application, FLEX will use the DHCP supplied IP address. If you then use the camera in another application without a DHCP server, your device will always default to the known fallback IP address.

NOTE: Do not set the fallback IP address the same as the device IP address. It is recommended to keep the default fallback IP address.

IP Address Recovery

In the event that the device is not visible on the network, the network has changed, or the static IP address details have been lost, reset the BirdDog back to its default settings by following the factory reset procedure.

BirdDog Name

You can give your device a meaningful name to make identification easier when viewing NDI® sources on a receiver such as a TriCaster, vMix or Studio Monitor. Be sure to make the name unique, as no two devices on the network should have the same name. The name can be any combination of a–z, 0–9, and –.

After renaming your device, navigate back to the System menu and click the REBOOT button. The camera will re-initialize and you'll be good to go.

PTZ
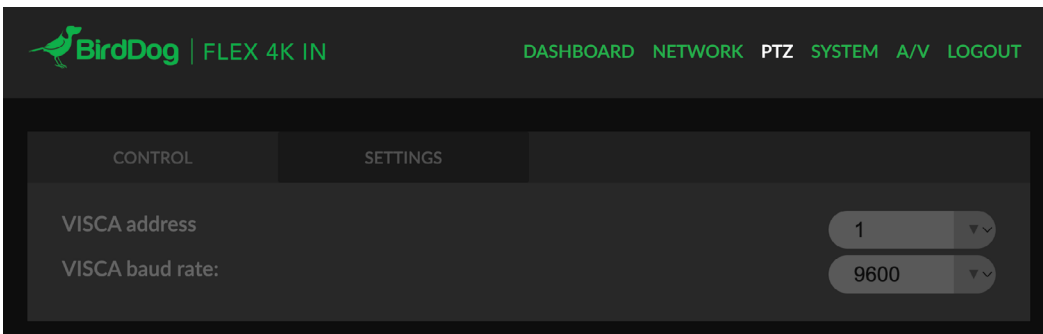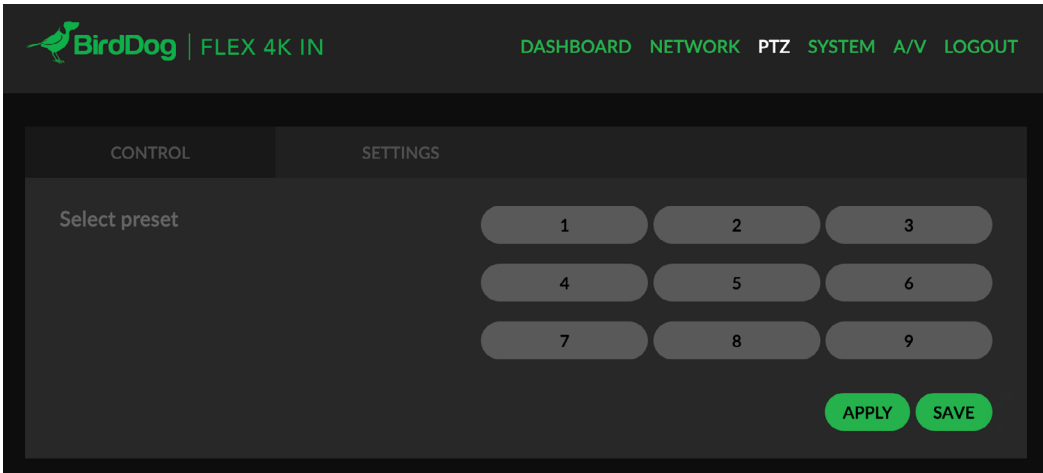
BirdDog FLEX 4K IN and FLEX 4K BACKPACK can control external PTZ cameras from the RS-232 serial port using the Sony VISCA protocol.

The PTZ Control tab controls allow you to save and recall 9 camera presets. Select the Settings tab to set your cameras VISCA address and Baud Rate accordingly. By default, these settings are:
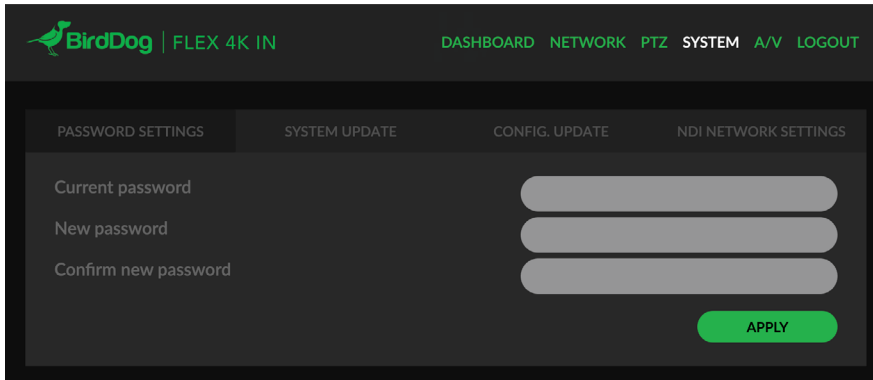
VISCA ADDRESS: 1
VISCA BAUD RATE: 9600

Once these settings are correct you can control your external PTZ camera within any PTZ-aware NDI control application as if it was a native NDI PTZ camera.

System

Password Settings

The BirdUI is secured by a user-selectable password. To make changes to any settings, you'll need to log in.
The default password is **birddog** (one word, lower case). It is recommended that the default password be changed, since the BirdUI grants full access to the camera configuration settings.

You can change the password in the Password Settings tab.

1. Enter the current password.
2. Enter the new password. It is recommended that you change this password to prevent unauthorized changes in a network environment where the device is shared with other users (e.g. not private). Confirm the new password and click the APPLY button.
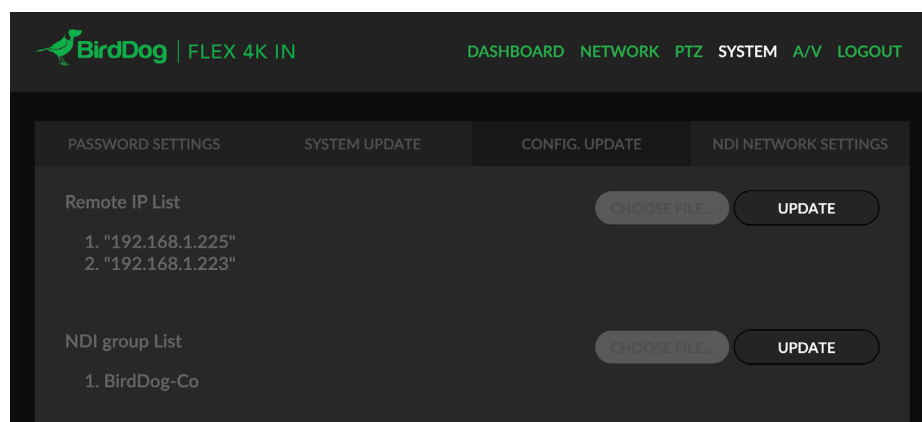
System Update
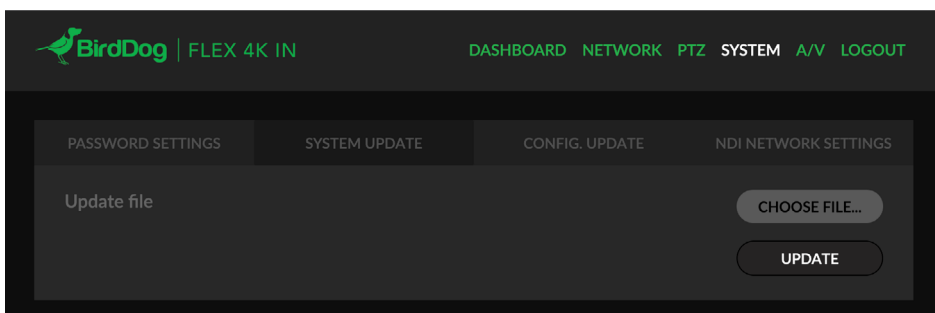
We are always adding new features and improving the performance of our products, so installing the latest firmware will provide you with the best user experience.

To upgrade the firmware, download the firmware and follow the **Firmware Upgrade Instructions** located in the download folder.

Configuration Update

Remote IP List

By default, NDI® devices are visible to each other only when they're on the same VLAN. If you want visibility or control of a device on a different VLAN, you can add it's address manually as a Remote IP. You can upload and download Remote IP Lists for sharing with other cameras. To upload a list:

1. Click the CHOOSE FILE button to load your Remote IP List in UTF–8 encoded string format.
2. Click the UPDATE button. Do not upload a blank list.
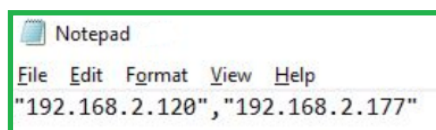
NDI Group List

Set the NDI® Group list. NDI® groups allow you to restrict communication to only devices that belong to the same NDI® Group. NDI® Groups can be very useful to control visibility and access in larger environments. You can upload and download Group lists for sharing with other cameras. Groups also need setting up in NDI Access Manager, available in NDI Tools.

To upload a list:

1. Click the CHOOSE FILE button to load your NDI® Group List in UTF–8 encoded string format.
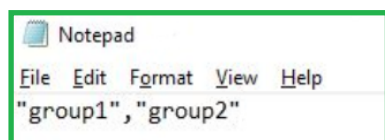2. Click the UPDATE button. Do not upload a blank list.

Network Settings

Preferred Transmit Method

TCP

TCP is the default method of transmission for NDI®. It operates well within local networks with predictable latency and limited jitter. BirdDog recommends that TCP be used for typical applications, with alternative transports used only for specific reasons.

UDP

UDP is recommended for networks where there is extended latency.The nature of UDP allows dropped packets and doesn't establish handshaking dialogues to confirm each received packet – which can improve performance. Using UDP can have some consequences if there are other issues on the network such as jitter or lost packets as it will not inherently re-sent a lost packet.

Multicast

Multicast is especially useful for use cases that require a single source to be received on multiple receivers simultaneously. Utilizing Multicast offloads the distribution of the NDI® A/V packets from the BirdDog device to the network infrastructure. You should take care to ensure your network is specifically configured to support Multicast as using it on an ill-prepared network can create unintended network problems.

MultiTCP

MultiTCP is a new NDI transport method that allows users to send NDI® video over poor network topography such as WAN (Wide Area Networks) without experiencing packet loss and lost frames. Historically, UDP transport was the only option to send NDI video over a WAN, allowing the NDI® video to travel without dropping frames but resulted in dropped packets being missed which could cause unstable video. UDP also places more performance demands on devices sending and receiving the signal.

MultiTCP employs a new method of sending TCP packets whereby it opens a mass of TCP connections over the WAN and uses them in a 'round robin' manner, this allows each individual TCP connection enough time to acknowledge the receiving packet, confirm nothing is lost and prepare for the next one before it's sent the next TCP packet in the round robin. This is similar to a RAID setup in traditional storage.

NDI Discovery

If you choose to use a NDI® discovery server, you can configure it in this tab. By default, NDI® utilizes mDNS (multicast Domain Name System) to create the zero configuration environment for discovery. Unless the network is specifically configured to not allow mDNS, NDI® sources will be discovered.

The NDI® discovery service is designed to replace the automatic discovery NDI® uses with a server that operates as an efficient centralized registry of NDI® sources that requires much less bandwidth. NDI® discovery server also helps with location of devices that reside on different subnets. The NDI® Discovery Server is available in the NDI 5.5 version of the free NDI Tools (C:\Program Files\NDI\NDI 5 Tools\Discovery\ NDI Discovery Service.exe).

1. If you are using an NDI® Discovery Server, click the ON button.

2. Enter the IP address of your NDI® Discovery Server.

3. Click the APPLY button to save your changes.
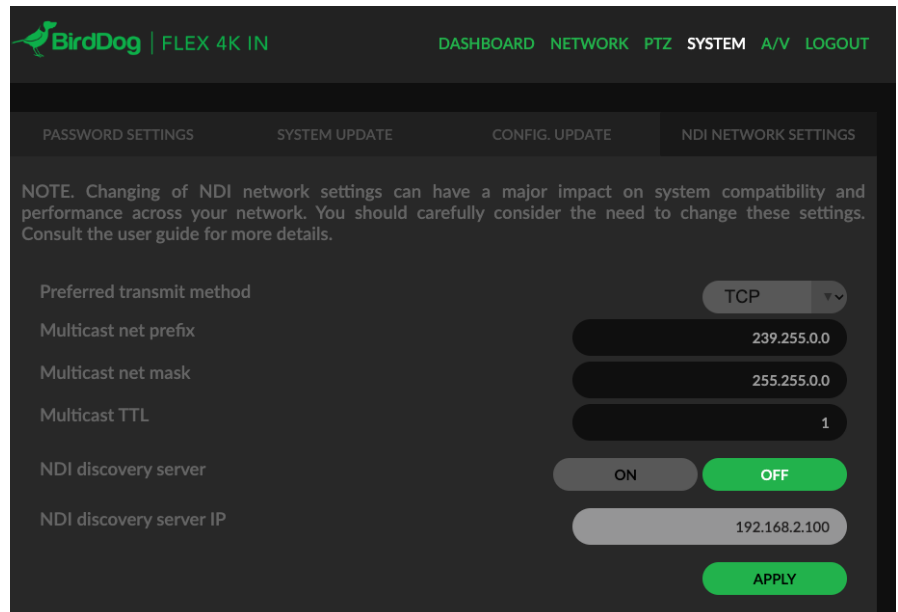
AV
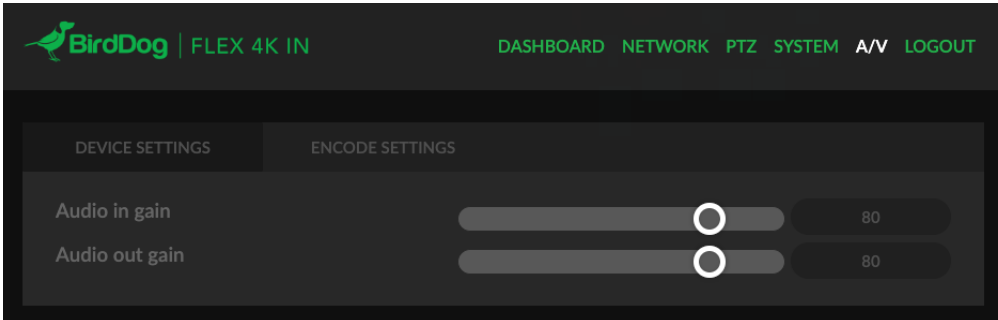
Device Settings

Audio Gain

Controls for adjusting the audio gain.

Encode Settings

Video Input Format

This converter is capable of accepting many different video formats to encode to NDI®. For the most part it is recommended to leave the Video Input Format set to AUTO, you can manually override this setting and choose whatever resolution your source device is set to. This can be useful if there is an issue in synchronising video input resolutions.

Colour Space

BirdDog FLEX has built in colour space conversion – some HDMI computer sources provide video in RGB or YUV colour space while others provide the source as YVU colour space, notably Apple Mac machines. If you experience inverted colours on your computer-based input, swap YUV for YVU colour space.
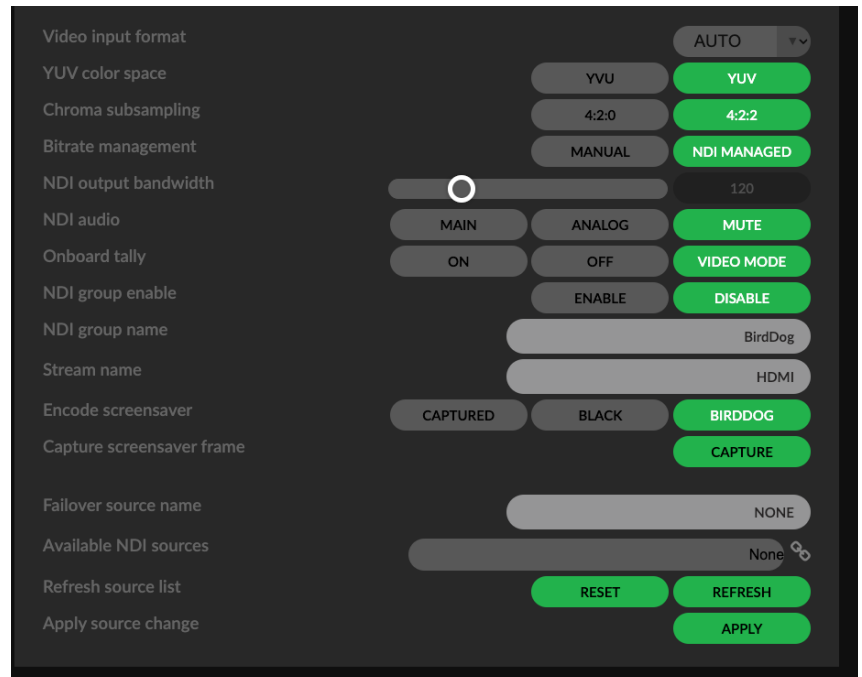
Chroma Subsampling

This BirdDog converter is capable of operating in two Chroma Subsample modes, 4:2:2 and 4:2:0. According to the NDI specification, when you are operating in HD video resolutions the chroma subsampling should be set to 4:2:2 and in 4K is should be set to 4:2:0.

The BirdDog 4K converter line allows you to override these recommendations depending on your own needs. This can result in greater representation of colours in your image, or less overall video compression. Generally speaking, for video-sourced material in 4K it is recommended to use 4:2:0, but for computer generated graphics such as gaming and presentations your chroma subsampling should be set to 4:2:2.

Bitrate Management

Birddog Devices allow you to set your target NDI® output bitrate. This allows you to select a level of compression that is more efficient on your networking infrastructure (lower bandwidth) or higher image quality for critical footage. The scale allows you to select anywhere from 60 Mbps to 360 Mbps.

By setting Bitrate Management to NDI MANAGED, FLEX will manage the target bitrate in accordance with the NDI® standard. By selecting MANUAL, you are able to manually select a target bitrate.

NDI Output Bandwidth

If you have selected a Manual bitrate management, you may set your target NDI® output bitrate here. This allows you to select a higher bitrate stream for a higher quality video if your network capacity allows. Select from 60Mbps to 360 Mbps.

NDI Audio

Select MAIN to enable NDI® audio only and ANALOG to enable audio in from the audio input. Select MUTE to disable the NDI® audio.

Onboard Tally

On/Off: When connected to a Tally capable device, the Tally LED will illuminate Green for Preview and Red for Program.

Video: This selection uses the Tally light to indicate the presence of a HDMI signal at the input.

NDI Group Enable

This allows you to limit the visibility of the device to other devices that belong to the same NDI® group. By default this setting is DISABLED. When enabled the receiver device needs to also be set to the same identical group name. Commonly this is done using the NDI Access Manager application provided by NewTek free of charge. NDI® Groups can be very useful in larger environments to control visibility and access amongst various groups.

NDI Stream Name

When your BirdDog converter generates an NDI® stream, it can be identified via it's name on any NDI®-capable receiver. You are able to nominate the NDI®stream name here to give you a more descriptive name of the source you are connecting to. This can be particularly useful in multi-channel devices or on networks where there are a large amount of NDI® streams.

Encode Screensaver

Assign a captured frame, black frame, or BirdDog logo as a screensaver.

Capture Screensaver Frame

Click the Capture button to capture the current frame for use as a screensaver.

Failover Source

If the generated NDI® stream is interrupted for any reason the receiver can automatically switch to a nominated alternative NDI® stream. This is particularly useful for live 'on air' productions where there can be no risk of still frames or black being broadcast should any source no longer be available. Select an available NDI® source for the failover function from the Available NDI® Sources dropdown list. You can update this list by clicking the Refresh button.

Factory Resetting Your Unit

If you have lost network settings or cannot find FLEX on the network, you can perform a network factory reset.

To perform a reset, use a tool such as a SIM eject tool to press the reset button located next to the RS-232 port for 5 seconds until the Halo Tally flashes red. The unit will be accessible, as per factory settings, approximately 10 seconds later.

Receiving NDI Streams

There are many applications that support receiving the NDI® signal that the unit produces. Each application will vary slightly on how you choose your source.

NewTek Studio Monitor

NDI® Tools is a free suite of applications designed to introduce you to the world of IP video and is available here.

The included Studio Monitor application allows you to monitor many NDI® sources on a standard Windows computer. Once Studio Monitor is launched, right click anywhere in the interface and select FLEX from the dropdown list.

Once connected to FLEX, a configuration gear icon is displayed on the bottom right-hand side of the video display providing shortcut access the WebUI.

NewTek TriCaster Series

NewTek TriCaster series devices allow several NDI® sources to be received simultaneously, the number of simultaneous connections depending on what model TriCaster you have.

To select the FLEX as a source on your TriCaster, click on the configuration gear icon below your desired source location. From the displayed Input Setting dialog, select your camera source from the dropdown list.

Once connected to FLEX, a configuration gear icon displays next to the source dropdown window that provides shortcut access the FLEX WebUI.

Glossary

Domain

A domain contains a group of computers that can be accessed and administered with a common set of rules. Domain can also refer to the IP address of a website on the Internet.

DNS

DNS (Domain Name System) is a system used by the Internet and private networks to translate domain names into IP addresses.

mDNS

mDNS (Multicast DNS) refers to the use of IP multicast with DNS to translate domain names into IP addresses and provide service discovery in a network that does not have access to a DNS server.

Ethernet

Ethernet, standardized as IEEE 802.3, refers to a series of technologies used to connect computers and other devices to a LAN (Local Area Network) or wide area network (WAN).

Firmware

Firmware is a class of software held in non-volatile memory that provides the low-level control for a device's hardware.

Gigabit Ethernet (GigE)

An Ethernet capable of transmitting frames at a rate of a gigabit per second. A Gigabit capable Ethernet network is recommended for NDI production workflows.

IP

IP (Internet Protocol) is the communications protocol for the Internet, many wide area networks (WANs), and most local area networks (LANs) that defines the rules, formats, and address scheme for exchanging datagrams or packets between a source computer or device and a destination computer or device.

LAN

LAN (Local Area Network) is a network that connects computers and devices in a room, building, or group of buildings. A system of LANs can also be connected to form a WAN (Wide Area Network).

Mbps

Mbps (Megabits per second) is a unit of measurement for data transfer speed, with one megabit equal to one million bits. Network transmissions are commonly measured in Mbps.

NDI

NDI (Network Device Interface) is a standard allowing for transmission of video using standard LAN networking. NDI® comes in two flavours, NDI® and NDI|HX. NDI® is a variable bit rate, I-Frame codec that reaches rates of around 140Mbps at 1080p60 and is visually lossless. NDI|HX is a compressed, long-GOP, H.264 variant that achieves rates around 12Mbps at 1080p60.

Packet (Frame)

A packet s a unit of data transmitted over a packet–switched network, such as a LAN, WAN, or the Internet.

PELCO

PELCO is a camera control protocol used with PTZ cameras. See also VISCA.

PoE

Power over Ethernet

Port

A port is a communications channel for data transmission to and from a computer on a network. Each port is identified by a 16–bit number between 0 and 65535, with each process, application, or service using a specific port (or multiple ports) for data transmission. Port can also refer to a hardware socket used to physically connect a device or device cable to your computer or network.

PTZ

Pan, tilt and zoom.

RJ45

A form of standard interface commonly used to connect computers onto Ethernet–based local area networks (LAN).

RS422, RS485, RS232

Physical layer, serial communication protocols.

Subnet

Subnet or subnetwork is a segmented piece of a larger network.

Tally

A system that indicates the on–air status of video signals usually by the use of a red illuminated lamp.

TCP

TCP (Transmission Control Protocol) is a network communications protocol.

UDP

UDP (User Datagram Protocol) is an alternative protocol to TCP that is used when reliable delivery of data packets in not required.

VISCA

VISCA is a camera control protocol used with PTZ cameras. See also PELCO.

WAN

WAN (Wide Area Network) is a network that spans a relatively broad geographical area, such as a state, region, or nation.

White Balance

White balance (WB) is the process of ensuring that white objects and by extension, all colour, in your video are rendered accurately. Without correct white balance, objects in your video display unrealistic color casts.

WELCOME TO THE FUTURE.

bird-dog.tv

hello@bird-dog.tv