



Connect Spark Plus™

NDI® Adapter

Operating Instructions

NDI®

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Table of Contents

SECTION 1 QUICKSTART	1
SECTION 2 INTRODUCTION AND SETUP	5
2.1 Overview	5
2.2 Getting Ready	5
2.3 Making Connections	6
2.4 Web Configuration	6
2.4.1 Studio Monitor	7
2.4.2 Logging In	9
2.4.3 Audio/Video Settings	10
2.4.4 A/V Format	10
2.4.5 Device and Channel Name	10
Audio	11
2.5 Network Settings	11
2.5.1 NDI Connection	11
2.5.2 Ethernet	12
2.5.3 Local-Link (Failsafe)	12
2.6 Tally	13
APPENDIX A: ABOUT NDI®	15
2.7 A 'Video Internet'	15
2.8 NDI Benefits	16
2.9 NDI Virtual Input	16
APPENDIX B: END USER LICENSE	18
APPENDIX C: CREDITS AND TRADEMARKS	27
Trademarks	27

Section 1 QUICKSTART



This section explains how to connect and configure your NewTek Connect Spark™ Plus. It also explains how to update the device, and where you can find additional NDI® software to extend your workflow. After completing this short section, you'll be ready to begin using your new device.



This document briefly describes how to prepare your new NewTek™ device for use. Please note that more detailed information is provided in the next chapter.

Step 1 – Downloads

1. Visit <http://new.tk/NCSPInfo> using the web browser of a computer and use links in the Spark Plus™ group to download the following:
 - a. The NewTek NDI® Tools pack
 - b. The Spark Plus™ User Manual.
2. Install NDI Tools on your computer.

Step 3 – Connect Spark Plus



FIGURE 1

3. Connect Spark Plus to your local network router or switch using an Ethernet cable.
4. Connect power from the supplied power adapter to the USB-C port, located at right beside the audio input connector.

Step 4 – Access Spark’s Webpage

5. Use the NewTek Studio Monitor application installed with your NDI® Tools pack to locate Spark Plus on the network as follows:
 - a. Click the menu gadget at upper-left to view NDI sources.
 - b. Use the menu to select NDI_SPARK_PLUS (Channel-1) as the current Studio Monitor source.
 - c. Then click the gear icon at lower right when your mouse pointer is over Studio Monitor to open Spark’s webpage in your web browser.

Note: Step 4, accessing the device webpage, varies slightly for OS X users. Please refer to Section 2.4 for details.

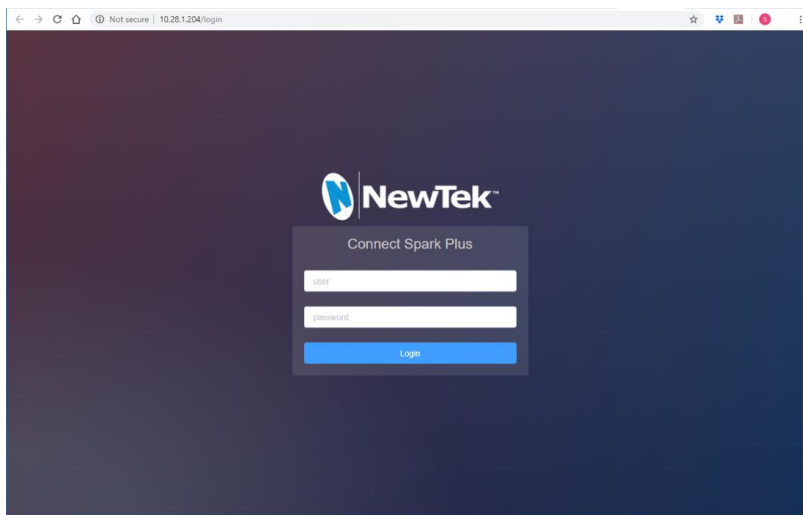


FIGURE 2

6. Login to the webpage (Figure 2) using the default user name (“admin”) and password (also “admin”).

At this point, your Spark’s Web Configuration page will appear (Figure 3).

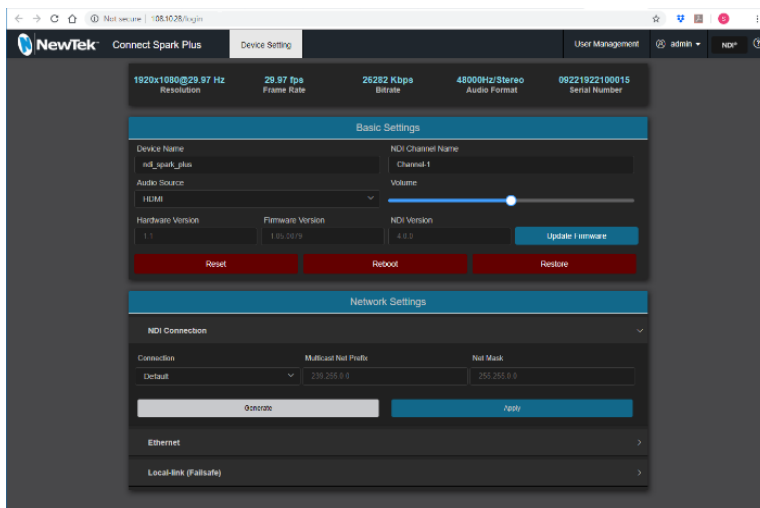


FIGURE 3

Step 5 – (Optional) Update Your Spark Plus Firmware

We encourage you to keep the firmware on your NewTek™ device up to date. Firmware updates may contain bug-fixes, provide improved performance, or even enable new features.

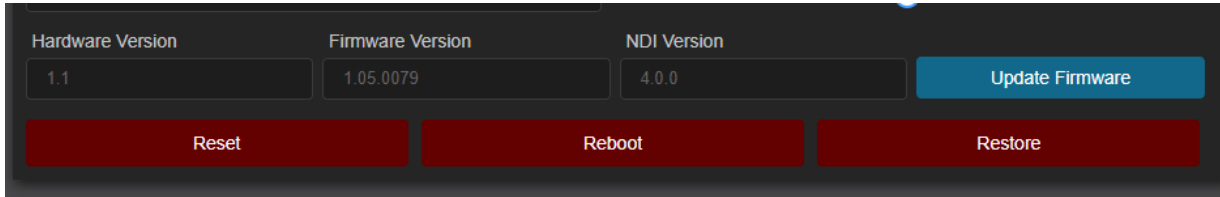


FIGURE 4

The update process is not complicated – simply follow the steps listed below:

7. Download and unzip the firmware update archive to extract the '.bin' file.
8. Click the Device Settings tab at the top of Spark's webpage, and compare the Firmware Version *shown* to the number in the filename of the firmware version you downloaded. If the download has a higher revision number, continue below to perform the update.
9. Click the Update Firmware button, and click Choose File to show a file explorer.
10. Use the file explorer to locate the firmware .bin file, and follow the prompts to perform the update.

Spark will reboot during this process, which can take up a few moments. Please be careful not to interrupt power to the device during the update process.

11. Following a firmware update, we recommend performing a Restore operation. A recessed Reset button is located at left on Spark's connector panel, or you can use the Restore function from the web page.

Hint: On some web browsers, you may occasionally need to clear the browser's cache (history) to see the result of a firmware update or Factory Reset. Also, please note that it can take a minute or two before the NDI channel name shown in NDI Studio Monitor refreshes.

The IP address of the device can change as a result of a Restore operation. You may need to use Studio Monitor to locate the device on the network and log in again afterward. Also, if you have previously set a manually configured IP address for the unit, you will need to reconfigure the IP settings again following a Restore operation.

Hint: Should you set a custom password and then forget it, you can reset the device to factory defaults using the Factory Reset process described in Section 1.

Conclusion

This completes the initial setup of your NewTek™ Spark Plus. You should see its output displayed on Studio Monitor. The sections that follow provide more in depth coverage of Spark's features and options.

Section 2 INTRODUCTION AND SETUP



This section, like the preceding one, explains how to connect and configure your NewTek Connect Spark Plus™. The discussion in the chapter, however, is more leisurely and detailed, and you may find it helps answer any questions that have arisen thus far.

2.1 OVERVIEW



Thank you for purchasing this NewTek™ product. NewTek is extremely proud of its record of innovation, and its commitment to excellence in design, manufacture, and superb product support.

NewTek provides some of the most advanced live production tools available anywhere, and we are confident you will find them exceptionally powerful and versatile.

Your NewTek Connect Spark Plus™ unit delivers a huge amount of functionality in a compact package. Prosumers and video professionals alike will appreciate the convenience and flexibility it provides in connection with both video production and capture.

Unlike typical encoders and capture card systems, your NewTek Connect Spark Plus™ unit leverages the NewTek's NDI-based IP workflow, supported by leading video software and hardware developers around the globe. This manual will assist you to install and configure your new Spark Plus™.

2.2 GETTING READY

Your NewTek Connect Spark Plus uses the NDI® protocol for audio/video transmission, and more. Your first step will be to install a few NDI utilities appropriate for your computer platform or device:

NDI®

1. Navigate to <http://new.tk/NCSPLinfo> in your web browser, and follow directions to download and install the NewTek NDI Tools pack, available at no cost.

NDI Tools provides a very valuable array of practical NDI learning tools and utilities, including NewTek's NDI Studio Monitor, which will not only locate and display the network video output from your Spark Plus unit, but also makes it easy access to its settings.

2.3 MAKING CONNECTIONS



FIGURE 5

1. Supply *power supply* to the unit, by connecting the supplied power adapter to Spark's USB-C port, located beside the audio input connector. The unit boots as soon as power is. At this point, the NewTek logo will illuminate. (If this does not happen, check your connections and retry.)
2. Continue to connect one end of a network cable to Spark's RJ-45 Ethernet port.
3. Connect the other end of the cable to your network switch or router.
4. Optional steps:
 - a. Connect an HDMI video cable from a suitable video source to Spark's HDMI input connector.
 - b. If you wish, connect an analog audio source to the 6.35mm stereo audio input.

If you connected a video source in step 4 above, your NewTek Connect Spark Plus is already sending NDI audio and video to your local network. We'll talk about how to access and use it soon, but first let's discuss how to access Spark's settings and features.

Hint: In 'mission' critical installations, it is wise to use an uninterruptable power supply (UPS). Likewise, consider A/C "power conditioning", especially in situations where local power is unreliable or 'noisy'. Surge protection is especially important in some locales. Power conditioners can reduce wear on power supplies and other electronics, and provide a further measure of protection from surges, spikes, lightning and high voltage.

2.4 WEB CONFIGURATION

NewTek Connect Spark Plus is very easy to use. In many installations, all you need to do is supply power, connect a video source and your network, and you're ready to go.

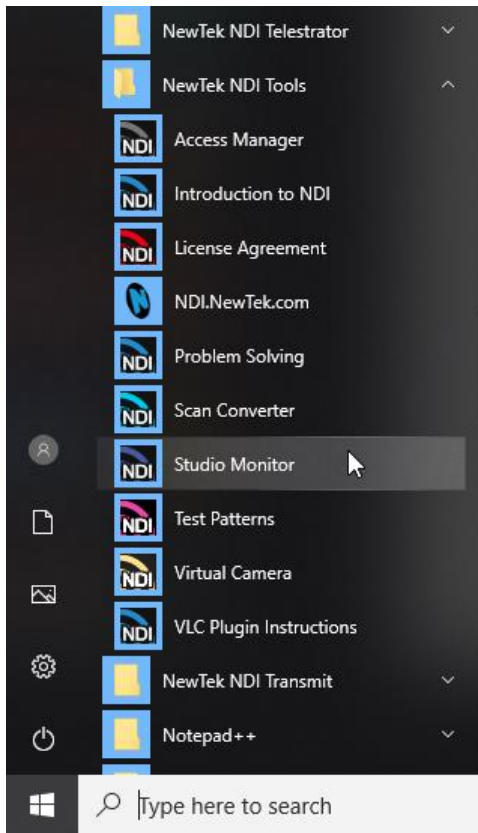


FIGURE 6

Sometimes, though, you will want to access your Spark’s settings, perhaps to configure login credentials, update firmware, etc.

Settings are made available by means of Spark’s configuration webpage, which you can access from any suitable device (i.e., one with a web browser) on the same network.

Note: As web browsers vary widely, you may occasionally find it necessary to delete cached files (sometimes referred to as the browser’s “history”) before the display refreshes to properly show some recent change. This can happen, for example, after a firmware update.

KEEP READING TO LEARN HOW TO ACCESS YOUR CAMERA’S WEBPAGE.

Some devices provide direct, easy access to Spark’s configuration webpage.

For example, when you select output from a Spark as the source for a NewTek TriCaster® switcher input, a convenient “Device Webpage” button is shown in TriCaster’s Input Configuration panel. Simply click this to open the corresponding web control page.

2.4.1 STUDIO MONITOR

For other platforms, you can use the Studio Monitor application you installed back in Section 2.2 in a similar manner.

Windows platform users can launch Studio Monitor from the system’s Start menu (Figure 6), where it will appear in the NewTek NDI Tools folder. Among its capabilities, Studio Monitor (Windows) can detect and display NDI sources available on your network.

OS X users will also find a similar NDI Video Monitor application available to them after installing the NewTek NDI Tools pack for their preferred platform.

LOCATING SPARK PLUS ON THE NETWORK – WINDOWS™

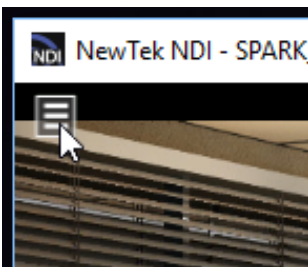


FIGURE 7

1. Launch Studio Monitor, and click the small menu (‘hamburger’) gadget at upper left to open the application menu.

Among other things, this menu displays all NDI sources detected on your network.

2. Shortly, you should see a new main entry named NDI_SPARK_PLUS added to the menu. Roll the mouse pointer over this label to show the channel names for NDI output streams from any Spark Plus units detected.

Hint: Detection of newly-connected NDI sources can take a few moments; in network settings with a great number of NDI sources available, a complete refresh of the source list can take a minute or even more.

When the sub-menu lists multiple NDI channels with the same name, the device IP addresses are shown to further identify them. (NDI users seldom need to bother with mundane matters such as IP addresses. 😊)

Select the newly listed channel for the Spark unit you wish to configure. In a few moments, its video output will appear in the Studio Monitor window.

3. For NDI sources that, like Spark Plus, host a configuration web page, a small configuration (gear) icon appears at lower right when you the mouse pointer is over the Studio Monitor window – Figure 8.



FIGURE 8

4. Click the gear to open the corresponding web page, popping up a request for you to enter login credentials (Figure 9).

Note: *The Microsoft Edge™ web browser is not fully supported at this time. On Windows platforms, please use another modern web browser or Internet Explorer™.*

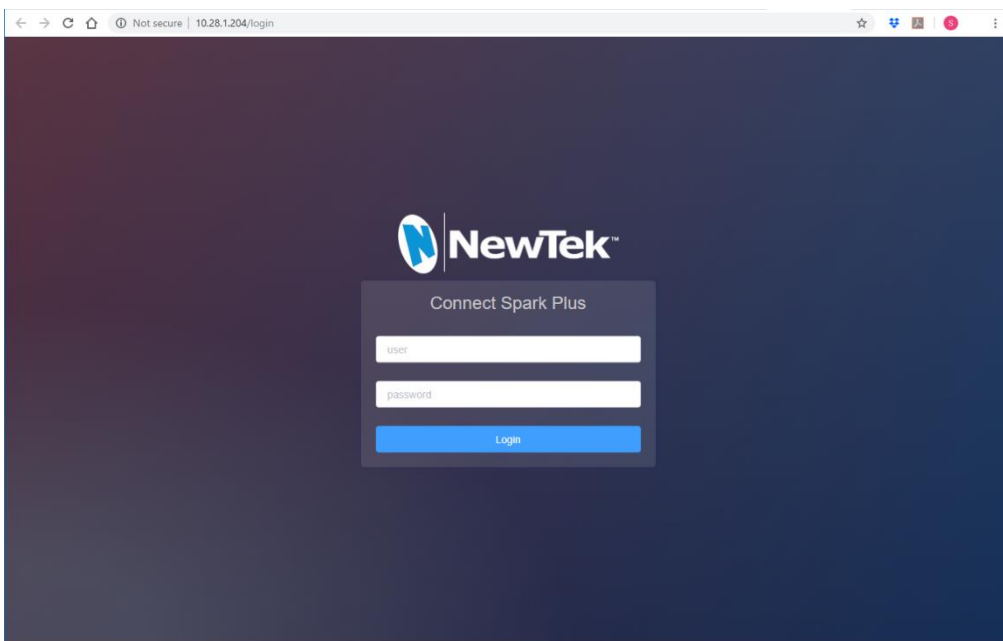


FIGURE 9

LOCATING SPARK PLUS ON THE NETWORK – OS X™

The process is very similar for OS X users.

1. Having launched the Video Monitor application, use the File menu at the top of the Desktop to locate a new main entry named NDI_SPARK_PLUS.
2. Rolling the mouse pointer over this label shows the individual names for the NDI output channels of any Spark Plus units detected on the network.

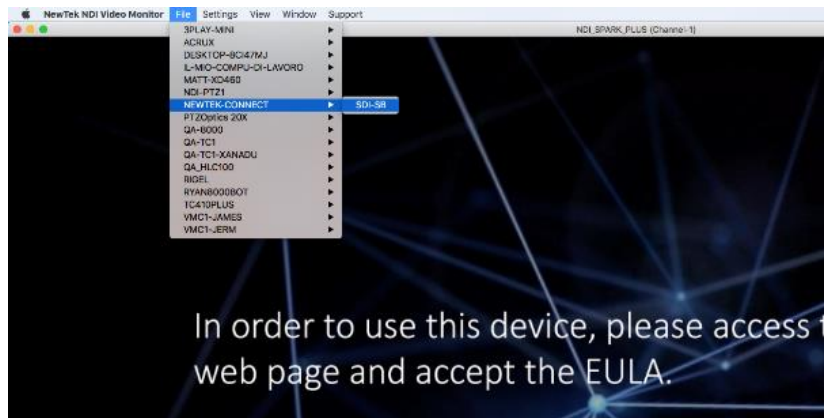


FIGURE 10

Hint: Detection of newly-connected NDI sources can take a few moments; in network settings with a great number of NDI sources available, a complete refresh of the source list can take a minute or even more.

When the sub-menu lists two or more NDI channels with the same name, the source device IP address is shown to further identify them. (Otherwise, NDI users seldom need to bother with mundane matters such as IP addresses. 😊)

Select the newly listed channel for the Spark unit you wish to configure. In a few moments, its video output will appear in the Studio Monitor window.

3. The Video Monitor Settings menu shows an option near the bottom that lets you open the Device Webpage in your system web browser. Select this item, and continue as follows.

2.4.2 LOGGING IN

1. Enter the Username “admin” and the default Password - also “admin”.

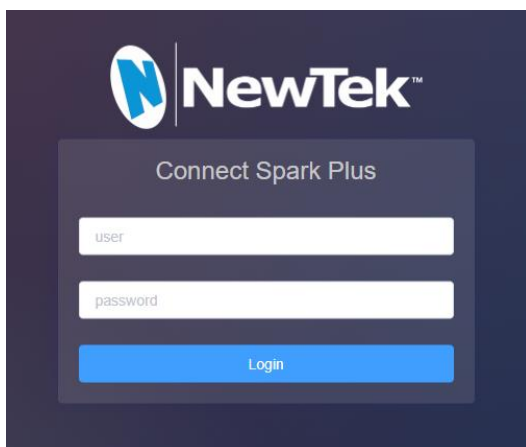


FIGURE 11

2.4.3 AUDIO/VIDEO SETTINGS

After logging in, Spark's options and controls are shown in your web browser (Figure 12).

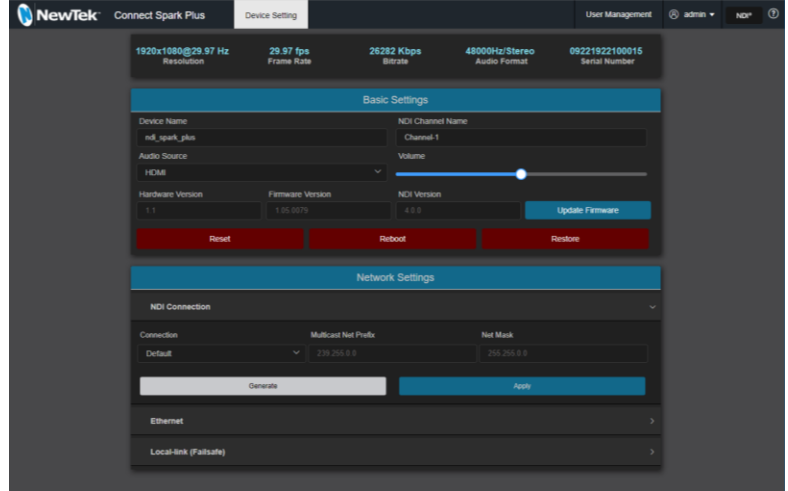


FIGURE 12

2.4.4 A/V FORMAT

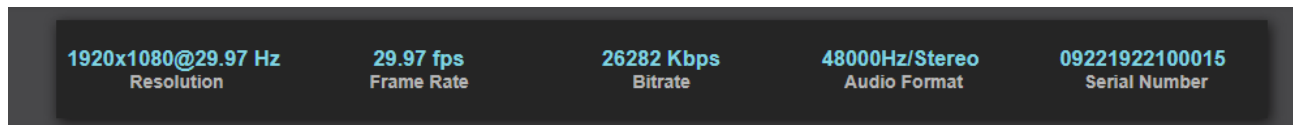


FIGURE 13

The uppermost section of the Device Setting tab on Spark's web page shows Audio/Video format details, along with the unit's serial number. These values are automatically detected, and are not editable.

Note: Models with 4K support can connect to video sources all the way up to 2160p29.97 formats.

2.4.5 DEVICE AND CHANNEL NAME

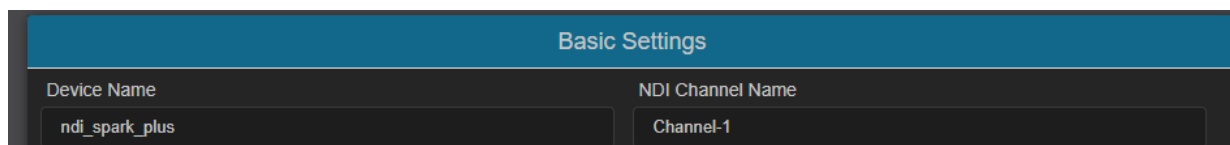


FIGURE 14

Just beneath, under the heading Basic Settings, you will find Device Name and NDI Channel Name boxes. The entries here determine how your Spark device is identified on your NDI network. These names are editable, allowing you a convenient way to identify the output of specific Spark units to downstream NDI-enabled devices and systems.

AUDIO

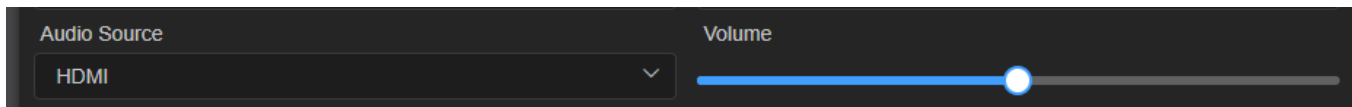


FIGURE 15

Just below, you will see the Audio Source menu (Figure 15). It offers two options, labeled Line In and HDMI. These determine whether Spark Plus uses the embedded audio source (digital audio included with the HDMI video source) or analog audio supplied to Spark’s 1/8” line level stereo input connector. Spark’s nominal audio level is +4dBu. The nearby volume control, not surprisingly, governs the audio output level.

2.5 NETWORK SETTINGS

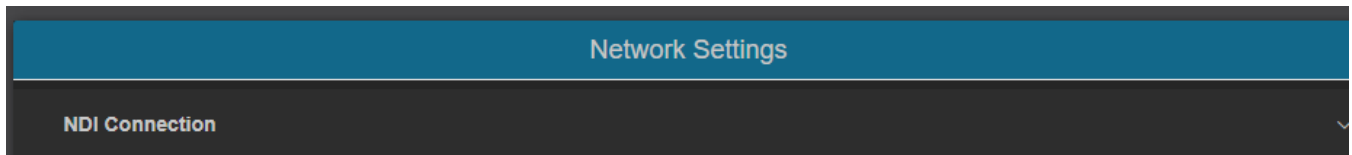


FIGURE 16

Just beneath the Reset, Reboot and Restore controls in the Device Settings tab is a control group labeled Network Settings, which is host to NDI Connection, Ethernet, and Local –Link settings.

2.5.1 NDI CONNECTION

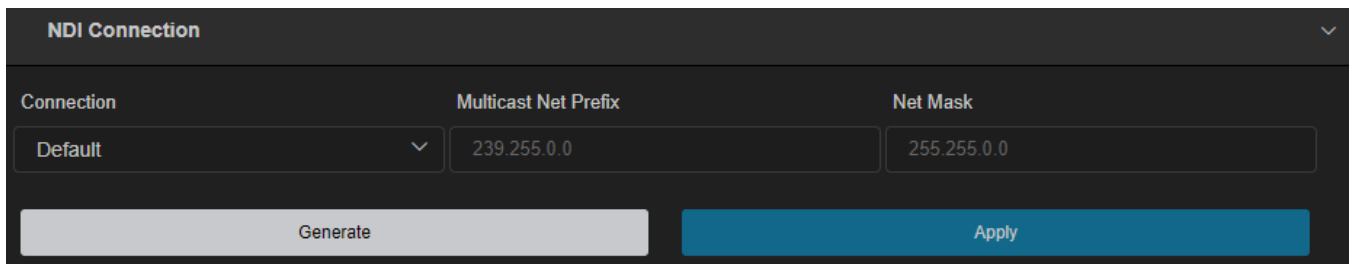


FIGURE 17

CONNECTION: DEFAULT OR MULTICAST

Select Multicast (**Error! Reference source not found.**) to transmit video using multicast, rather than the default unicast method. A suitable Multicast address is generated, but you can edit the result manually if you need to. To update the address to another random value, click Generate.

Please take time to consider the following information before enabling this feature.

MULTICAST OR UNICAST?

Multicast can seem like a bandwidth-saving miracle. Unlike NDI's default mode (unicast), multicast does not require a unique stream from the source to each receiver. When using unicast, each connection to the sender reduces the bandwidth available by a similar amount.

By contrast, multicast connections do *not* add significantly to the bandwidth required as connections multiply. You could be forgiven for wondering why anyone would ever turn this option off - yet, it is off by default. Why?

This is because multicast requires more careful network configuration. While you might not notice any issues in a simple network setting; a poorly configured environment can have serious impact on more complex networks.

- Specifically, it is essential that IGMP snooping be enabled for each switch on the network. This lets the device listen to traffic between other hosts, switches and routers, and identify receiving ports using various IP multicast streams.
- In addition, we strongly recommend that all network switches be of the 'managed' type (see the sidebar "Managed vs. Un-managed").

2.5.2 ETHERNET

Controls in this section will be quite familiar to anyone who has connected a computer or mobile device to a network, and require little explanation.

Typically, networks are configured to automatically supply IP addresses to devices you connect to it by means of a DHCP server. Your Spark's IP Address resolution method is set to Dynamic by default, to take advantage of this scheme. To assign a static IP address to your unit, change the IP Address setting to Manual.

2.5.3 LOCAL-LINK (FAILSAFE)

If Spark's default IP Address setting (Dynamic) should ever fail to provide a usable IP address within a minute or two - as when an active DHCP server is not found on the network - you can locate your Spark Plus on the network using its failsafe Local-Link feature.

In this scenario, temporarily set the network adapter of your computer to a static IP address such as 192.168.100.1, with a netmask of 255.255.0.0) and connect the Spark Plus.

Then run Studio Monitor on the computer, as described earlier to locate the unit. This will allow you to use Spark's web page to set a suitable static IP of your choosing, following which you can restore the computer's normal network configuration settings.

Managed vs. Unmanaged

An un-managed (a.k.a., 'dumb') network switch will broadcast a multicast stream to all devices on the network, with potentially very serious ramifications.

For example, even though a device broadcasts a multicast stream, the un-managed switch will pass *unicast* packets to downstream switches and clients. This can flood the network with unnecessary traffic, and slow it down as upstream devices are forced to wait for responses from the over-saturated devices.

The result of a poor setup can fairly be likened to a self-inflicted Denial of Service attack, and will definitely not endear you to your colleagues.



FIGURE 18

Your Spark Plus unit provides 'tally' notification from NDI devices supporting it.

Specifically, a row of LEDs will light up in red or green to tell you when video output from the device is visible on the Program output or Preview row of a video switcher respectively, as illustrated above.

APPENDIX A: ABOUT NDI®



NDI is much more than simply 'video over IP'. As you begin using it, you'll increasingly discover its many advantages. Soon you'll realize you never want to go back to simple 'point A to point B' methods of video transport.

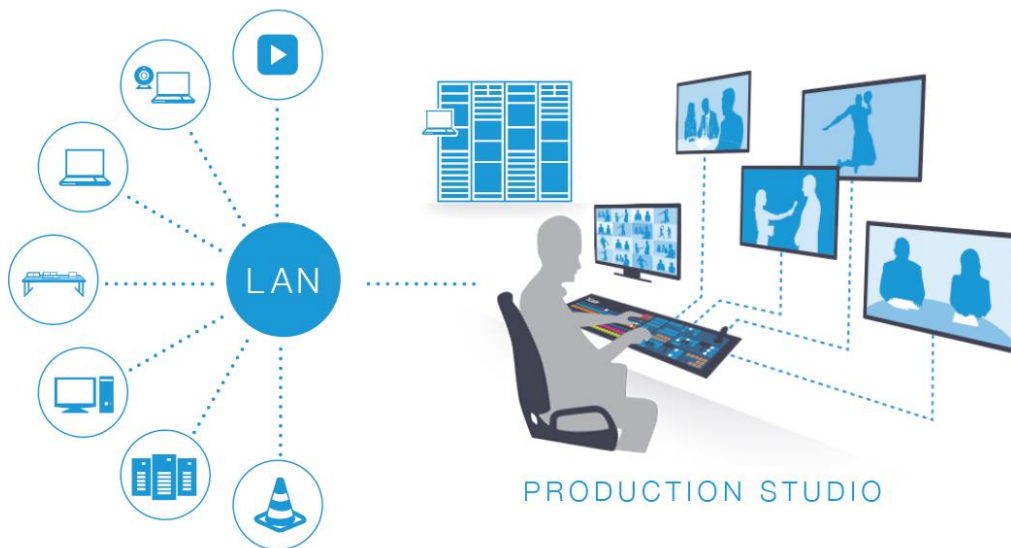
This section provides a brief overview of NDI and the power it delivers to unleash your creativity and provide newfound production efficiency.

We live in a world in which virtually every computer system in the world is potentially connected to every other. Likewise, our countless mobile devices are connected too. These devices have high quality screens, fast processors and cameras. It is no surprise, then, that efficient, economical, non-linear video transfer in IP space is augmenting and even superseding traditional linear connection methods (SDI, HDMI, etc.) and systems.

NewTek NDI® (Network Device Interface) makes it easy to share high-quality video over a local Ethernet network. However, the NDI vision is vastly exciting than any mere 'cable upgrade'. Production systems using IP to integrate data, video, and audio are transforming live video production in ways that would have seemed miraculous just a few years ago. You can think of NDI as turning your network into a 'video internet'.

NDI®

2.7 A 'VIDEO INTERNET'



Like a webpage, each NDI source is instantly available to many viewers and devices. Wherever your network extends – throughout your office, broadcast studio, hospital, campus (etc.) – NDI is ready for immediate display, capture, replay, production, and more. NDI operates bi-directionally over a local area network, and supports many ultra-low latency, ultra-high quality video streams on shared connections. It is resolution and framerate independent, and natively supports tally, metadata, access management, and more.

NDI's superb performance over standard 1Gbit/s networks makes it possible to transition facilities to an incredibly versatile IP video production pipeline without negating existing investments in SDI infrastructure, or costly new high-speed network installations. (NDI|HX is a related high-efficiency NDI mode expressly designed to facilitate wifi and long distance connections).

2.8 NDI BENEFITS

The NDI concept is simple: You supply a video source, and send it to your network as an NDI stream by means of your NewTek Connect Spark Plus™. At that point, anyone else on that network can see it and work with it just as if it was a locally connected to their system (unless you deliberately limit access).

In this brave new world of IP video, you hardly need to think about capture cards, SDI, HDMI connections, a/v formats, etc. You also enjoy freedom from dependency on distribution amps, video matrix routers, and the like. There are many hundreds of software and hardware systems with native NDI input and output support – both commercial and open source. Now you can supply your video to these without running bulky cables over long distances.

More than simply replacing a cable, though, NDI enables multiple applications to access the same sources at the same time. For example, you might simultaneously send high-quality, low latency video to your video mixer system, while also streaming it and capturing it elsewhere on your network. For a deeper introduction to the world of NDI, download and install the free NewTek NDI Tools pack from www.NDI.NewTek.com, which includes a Getting Started with NDI guide.

2.9 NDI VIRTUAL INPUT

If you installed the NDI Tools for Windows™, you were given the opportunity to install NewTek NDI Virtual Input at the same time. This is a very useful application that allows you to make a designated NDI source available on the local as a proxy 'webcam'.

In turn, this means that you can quickly and flexibly assign NDI sources from your network to supply video to applications like Skype™, GoToMeeting™, and more.

Hint: At the time of installation, you will be asked whether you would like to Virtual Input to be launched automatically when you boot the system. In most situations you may want to choose this option.

When running, NDI Virtual Input adds a small icon to the Windows task tray (**Error! Reference source not found.**).

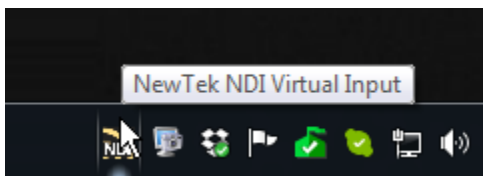


FIGURE 19

Configuring (and using) Virtual Input is very easy:

- Simply right-click the icon to select an NDI source from your network.

- The Settings menu item allows you mute or adjust audio levels, or select a Low Bandwidth mode, as you might do to make optimal use of your network when a lower resolution image will suffice.

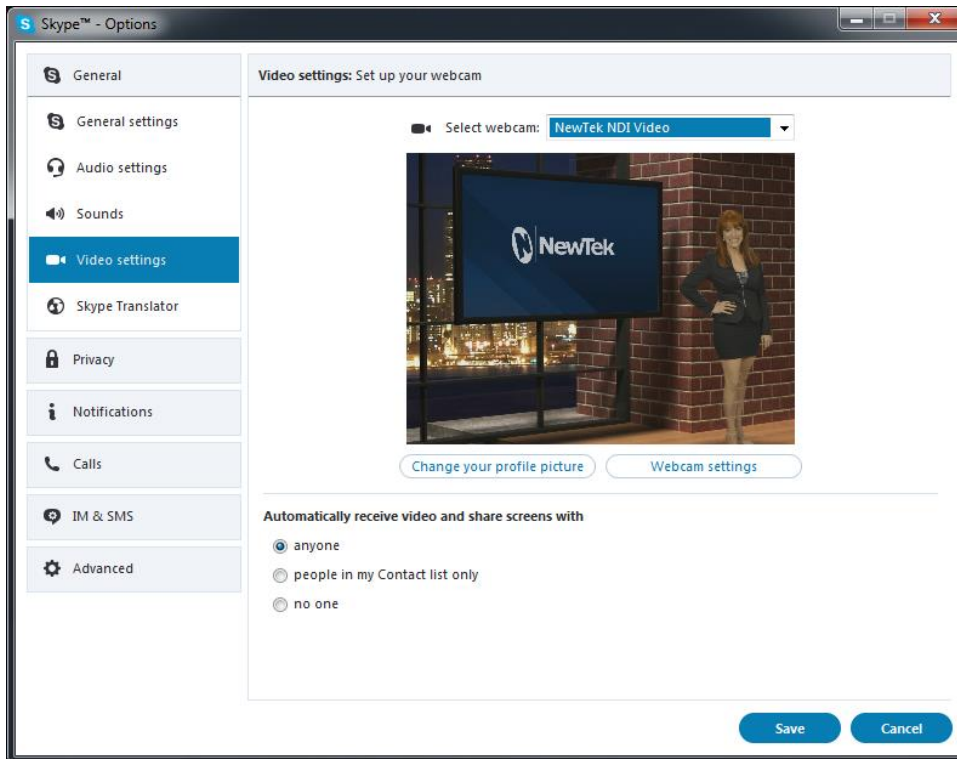


FIGURE 20

- Afterward, you will see an entry named NewTek NDI Video (or Audio) listed along with any other qualified sources available to applications like Skype™, etc.

APPENDIX B: END USER LICENSE

NewTek™ Software License and Limited Warranty

This NewTek Software License and Limited Warranty applies to combined software/hardware product provided including but not limited to:

TriCaster® TC1, TriCaster® TCXD8000™, TriCaster® TCXD860™, TriCaster® TCXD460™, TriCaster® TCXD410™, TriCaster® Mini™, TriCaster® Mini SDI™, TriCaster® TCXD40™, MDS1, Media DS, VMC1, NC1 IN, NC1 I/O, VMC1 IN, VMC1 OUT, 3Play™ 3PXD4800™, 3Play™ 3PXD440™, 3Play Mini™, 3Play™ 3PXD425™, TalkShow™, NewTek TC1, NewTek VMC1, NewTek NC1 IN, NewTek NC1 I/O, NewTek VMC1 OUT, TalkShow, TalkShow VS 4000, TalkShow VS100, Network Device Interface, NDI, NewTek Connect, NewTek Connect Pro, NewTek IsoCorder, NewTek IsoCorder Pro, NewTek NDI PTZ Camera, NewTek Connect Spark SDI, NewTek Connect Spark HDMI, Connect Spark Plus, NewTek NVG1 Vizrt IP Graphics Server, including all Factory Reconditioned versions of the above Products (except TalkShow factory reconditioned products).

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