AJA BRIDGE NDI 3G – Release Notes v1.6

Firmware/Software Update for BRIDGE NDI 3G

Introduction

BRIDGE NDI 3G is a 1RU turnkey gateway offering high density conversion to and from 3G-SDI to NDI and NDI to 3G-SDI for both HD and 4K/UltraHD. Designed to drop into any existing NDI or SDI workflow as a plug and play appliance, it is easy to deploy and administer.

BRIDGE NDI 3G brings immense conversion power and flexibility, fully controllable remotely for AV use, security and surveillance, broadcast, eSports, entertainment venues and a wide range of other facilities needing high quality, efficient NDI encode and decode. Set and forget, or use more dynamically as project needs dictate.

BRIDGE NDI 3G v1.6 is a feature and maintenance release. It is highly recommended that you update firmware to avoid any potential issues.

Be sure to consult the Installation and Operation Guide (user manual) for detailed information about features and configuration guidelines. The most current documentation, along with editable sample graphics projects (in Adobe Photoshop format) can always be found on the BRIDGE NDI 3G Support Page.

Documentation

For initial System Setup see the **BRIDGE NDI 3G Quick Start Guide** that shipped in the box with BRIDGE NDI 3G :

- **Do not discard!** The Quick Start Guide is **unique** to each BRIDGE NDI 3G system since it contains the unique admin password necessary to gain access to the system for the first time, or following a Factory Reset.

The BRIDGE NDI 3G Manual is available via the AJA website:

- https://www.aja.com/products/bridge-ndi-3g#support
    - Under the Manuals heading, the BRIDGE NDI 3G manual can be selected for viewing and/or download.

The BRIDGE NDI 3G Tech Specs are available via the AJA website:

- https://www.aja.com/products/bridge-ndi-3g#techspecs

The BRIDGE NDI 3G REST API documentation is self generating:

- To access the REST API from a remote system, type the IP address of BRIDGE NDI 3G slash "api" into your browser navigation bar: "<ipaddress>/api". This will launch the swagger UI for documentation and interaction.

Within BRIDGE NDI 3G itself:

- On the System Settings Screen, use the Resources>Product button to go directly to the BRIDGE NDI product page
- On the System Settings Screen, use the Resources>Support button to go directly to the BRIDGE NDI support page
- On the System Settings Screen, use the Resources>About Box for useful Keyboard Shortcuts.

Key Features, Fixes and Improvements in v1.6

2023-02-02

- Features:
    - NDI V5.5 Library support.
    - SD support
      SD rates 525i 59.94 and 625i 50 and are now supported. When an engine is running in NDI to SDI direction, it is required to set the SDI output correctly or SD output will not function. 525i requires the Bank to be set to Fractional. 625i requires the Bank to be set to Integer. 525i and 625i signals cannot be used simultaneously in the same bank. V+K is not supported with SD frame rates.
    - NDIFrameSync
      Starting in V1.6, Bridge NDI 3G supports an NDIFrameSync feature. This is a Viz-NDI technology which can be enabled or disabled on a channel by channel basis. The NDIFrameSync is only available in the NDI to SDI direction. The NDIFrameSync feature assists in keeping A/V sync in high frame rate and is very helpful for noisy signals like HX and Teams meetings.
      NDIFrameSync is activated on a per channel basis in the ‘Channels/Groups’ section.
      Resolves customer issues: Bad A/V Sync, HX decode, Black Flashes

- Fixes
    - Timecode values in API/UI do not account for frame rates. Previously it was only accurate for 29.97. Now it is accurate for all rates.
    - Fractional frame rates, such as 29.97 and 59.94 are different than other NDI sources and 29970/1000 rate calculation has been changed to 60000/1001 & 30000/1001
    - NDI media data can go over the control network. There is an existing NDI limitation when using an external NDI Discovery server, where it will send media over all networks, regardless of ‘Preferred Network’ settings. Bridge NDI has resolved this via the Internal Avahi Discovery Server, which now limits NDI Send/Receive to only the Media Network. ***Note: If external NDI Discovery server is used, in current release, media will access all networks***
    - /settings REST API object doesn't allow individual elements to be set.
      Use the REST API Swagger page which is just the IP address of the bridge box with /api added (IPADDR/api).
      Under /settings, click on Get, Try It Out and Execute. You should get a JSON object with all settings. Now, click on Put, Try It Out, erase everything in the JSON object except "engineRefreshRate" line and click

Execute. Now, go back to Get and Execute again. Before the fix, the response from Get would just be "engineRefreshRate". Now, it should be everything.

- Improvements
    - Network health
      Starting in V1.6, Bridge NDI 3G has changed the Network Alarm indicators.
      Alarm indicator on Network 1 and Network 2 now represent connection.
        Green - network device is connected
        Red - network device is not connected
        Grey – unknown
      Received and Transmitted Alarms present network usage in each direction and are defined by the network bandwidth set.
        Green – Bandwidth usage is under 80%
        Amber – Bandwidth usage is between 80% and 89%
        Red – Bandwidth usage is 90% and above

    - Send Mode Locked to Single-TCP: Starting in BRIDGE NDI V1.6, the send mode has been locked to Single-TCP and is not selectable. Send mode has been locked to Single-TCP, as we have found it to be the most reliable signal quality setting.
    - Receive Mode default to Single-TCP: Starting with BRIDGE NDI 3G v1.6, additional Receive Mode options were added, and the default setting was changed to Single-TCP, which we have found to be the most reliable signal quality setting.
    - Added spinning wheel and block operation during major mode changes that could cause crashes.

Key Features, Fixes and Improvements in v1.5

2022-04-20

- NDI 5 and NDI 4 are now both supported. BRIDGE NDI 3G can run in either mode via the Change button for NDI Version on the System Settings page. The change requires an application restart.
- Using an NDI Discovery Server is now supported. On the Source/Destination screen under NDI Network choose Advanced NDI Configuration. This dialog is used to toggle on/off using an external discovery service, as well as specifying the IP address(es) for the discovery service host(s) and to choose the Receive Mode.
- New options are available for NDI discovery updates. On the Source/Destination screen under NDI Network>Scan Mode, choices now exist for All Details, Only Names and Off. This functionality behaves the same way whether using NDI discovery via BRIDGE NDI 3G or else when using an external NDI Discovery service, and provides the option to curtail the amount of update traffic between BRIDGE NDI 3G and the network. See manual for more details.
- Buffering options are now available for achieving the best balance between lowest latency and high quality for NDI->SDI decoding. On the I/O screen when the Control Bar>Video Setup Tab is active, on the Canvas next to the Bank identifiers is a drop down that provides access to a range of settings. Minimum buffer provides the opportunity for the lowest latency, while Maximum buffer provides highest quality (i.e. none, or virtually no dropped

frames). Different network health/conditions will mean that the “sweet spot” can be different, and thus testing is always advised ahead of going live.
    - Note: Buffer settings are not present for SDI->NDI encoding, since BRIDGE NDI converts SDI to NDI in the fastest possible time.
- Timecode has been implemented for both SDI->NDI encoding and NDI->SDI decoding.
    - For incoming NDI, any timecode present will be embedded within SDI output across VITC1, VITC2 and embedded LTC.
    - For incoming SDI, any timecode present in VITC1, VITC2 and embedded LTC can be chosen or output via NDI. Alternatively, TOD (Time-of-Day) Timecode can be derived from either UTC or local TimeZone for output via NDI.
    - Timecode is displayed and controlled from the individual Channel/Group screens, and is also present as a global view, at the very bottom edge of the Control Bar>Video Setup Tab.
- System Date and Time has been upgraded to enable selecting either UTC or Local Timezone. Additionally, there is now also a Manual option to set date and time if working in a secure/non-internet connected environment.
- Menu column>Network; current device is now shown first in the list.
- System Setting>Support Log>Generate; Support logs now include BRIDGE NDI 3G serial number.
- System Setting>NDI Version; now shows full NDI version number.
- Remote access/GUI; iRUDP vs. UDP
- mplemented more graceful link degradation for remote monitoring and control, whereby a progressive reduction in image quality and rate for previews, enables continued connectivity and responsiveness. Note however, that low bandwidth or highly variable network internet/network conditions may still result in a “Disconnected” notification, until the worst of the network interruption has passed, at which point the connection will be restored.
- Video+Key Groups; rectified lack of video blackout and test pattern functionality.
- System Setting>System Name; Implemented a 44 character limit, since longer strings were sometimes causing problems for NDI output.
- Implemented continue/cancel pop-up-dialogs for; grouping/ungrouping channels and groups, changing default maximum NDI audio channels, changing reference (genlock), and changing between fractional/integer SDI output.
- Ki Pro Ultra Plus and BRIDGE NDI 3G; solved issue whereby, when on the same network together, attempting to open the Ki Pro Ultra Plus web interface would spawn an authentication dialog for BRIDGE NDI 3G.
- SDI output; resolved AV sync mismatch upon swapping between Integer and Fractional (Control Bar>Video Setup tab).
- Source/Destination screen>NDI Network>URL; fixed error whereby control network was reporting as media network.
- BRIDGE NDI GUI via browser; fixed problem with Firefox rendering with version 98 or above.

Key Features in v1.0

2021-10-27

- Easy to use interface with the tools needed for high quality bidirectional conversion between SDI and NDI.
- Robust, high-density video I/O and processing housed in a 1RU design, with dual redundant power supplies (100-240 VAC 50/60 Hz).

- Sixteen BNC connectors for 3G-SDI video I/O, and dual 10GigE onboard NICs for media and control network connectivity.
- Two independent BNC reference connectors.
- SDI->NDI encode and NDI->SDI decode supporting up to four channels of 4K/UltraHD, up to sixteen channels of HD or eight sets of Video and Key Pairs, or combinations thereof.
- Simultaneous SDI->NDI encode and NDI->SDI decode.
- Compatibility with a broad range of 3rd party NDI devices and software for both send and receive.
- Video processing tools, including scaling, padding, and integer/fractional conversions.
- 16-channels of embedded audio I/O per SDI connection, 16 and 24-bit quality, 48 kHz sample rate, synchronous.
- Remote configuration, monitoring and management via web-browser or REST API.
- Local configuration, monitoring and management via VGA and USB.

Expected Behavior and Known Issues

Performance / Features-by-Design

- BRIDGE NDI 3G is designed to work with rates up to 50/60p for HD and 4K/UltraHD. Maximum performance is up to 16-channels of HD 60p or 4 channels of 4K/UltraHD 60p. Network conditions, video processing load and other parameters may reduce channel count and/or supportable rates in some situations.
- BRIDGE NDI 3G is not intended to do real-time switching. Changing configurations will result in some time for signals to be re-acquired/locked, and if the change is system-wide this will momentarily affect all channels. System-wide changes include:
    - Changing between running BRIDGE NDI 3G under NDI library v5 and NDI library v4 (default is v4).
    - Changing Max Audio Channels on Control Bar > Audio Setup Tab
    - Changing Fraction/Integer Setting on Control Bar > Video Setup Tab (if decoding NDI to SDI)
    - Changing Reference setting for SDI output on Control Bar > Video Setup Tab (if decoding NDI to SDI)
    - Changing an Engine between Encoding (SDI to NDI) and Decoding (NDI to SDI)
    - Changing a Bank Mode between HD / V+K / 4K
- BRIDGE NDI 3G preview via Video Tiles on the I/O Screen in the GUI is for confidence monitoring, and performance may depend on various factors including network health and the remote system being used to access the BRIDGE NDI 3G Interface. BRIDGE NDI 3G prioritizes system resources for SDI / NDI Video I/O over the confidence monitoring presented on the Canvas. A more graceful link degradation for remote monitoring and control is implemented as part of BRIDGE NDI v1.5 onwards, and this can be seen as a reduction in image quality and rate for previews. Note however, that low bandwidth or highly variable network internet/network conditions may still result in a “Disconnected” notification, until the worst of the network interruption has passed. Increasing the bandwidth/quality/reliability of connection will resolve this.
- Using the system locally with the Kiosk Interface (via customer supplied VGA Monitor with USB Keyboard and Mouse) together with the supplied USB sound card, means that it's possible to confidence-monitor both audio and video without any additional tools. Via the remote Web Browser Interface, confidence-monitoring picture is possible via the I/O screen, but for audio monitoring a separate utility such as NewTek NDI Studio Monitor should be used.
- System Settings > Generate (Support Log) button is only available via remote Web Browser Interface (not presented via local Kiosk Interface).

- Control Bar > Presets Tab is for system presets only; there are currently no user presets available.
- BRIDGE NDI 3G supports Unicast only.
- BRIDGE NDI 3G can use either UTC or local Time Zone for system time. Either value can also be used for TOD (Time-of-Day) Timecode.
- The BRIDGE NDI 3G local (Kiosk) interface is dedicated to running the system, and is not intended as a general purpose interface where web browsing takes place.
- BRIDGE NDI 3G is designed for live/real-time workflows, and therefore does not support capturing or playing back media to/from local or remote storage.
- BRIDGE NDI 3G does not support all features found in Access Manager.
- Control Bar>Monitoring tab>Refresh Rate; note that this control is designed to allow the user to find the “sweet spot” for the smoothest representation of moving video in the confidence view, given network conditions and other variables. A value of 100% will most likely not be the optimal setting unless working in a very well behaved network environment.

Video and Audio I/O

- SDI I/O supports 1920x1080, 3840x2160p and 4096x2160. Support is not included for SD or 2K.
- NDI I/O is designed to receive NDI and NDI HX (v1, v2 and v3) and to transmit NDI (no NDI HDX Tx support).
- Note that when receiving from NDI HX sources, that full rate, smooth motion and latency performance are a function of the NDI HX transmitting device (in addition to network health). For example, phones and tablets tend to be less capable of sending properly timed / low latency streams.
- BRIDGE NDI 3G supports P216 for output, but does not support P216 for input.
- BRIDGE NDI 3G is not intended to do frame rate conversion. No 50->60, 60->50, 25->30, 30->25 conversions. If a 25p source is presented for output at 30p for example, the system will flag a warning error and no video will pass. The product can however, rectify and homogenize integer/fractional mismatches; i.e. if you have 7x 30p sources and 1x 29.97p source, and have set the output to be globally integer, the 29.97 input will be converted into 30p on output to match the other progressive outputs.
- BRIDGE NDI 3G can run 25/50 rates on one engine, whilst running 29.97-30/59.94-60 rates on the other e.g. Bank 1+2, vs. Bank 3+4, or vice versa.
- BRIDGE NDI 3G has two independent external reference connectors which can be used instead of free run for SDI Output. One Reference Input is for Engine A (Banks 1 and 2) and the other Reference Input is for Engine B (Banks 3 and 4).
- BRIDGE NDI 3G does not perform SDI up, down or cross-conversion. HD In -> HD Out, 4K In -> 4K Out, No HD <-> 4K.
- For NDI sources presenting non-SDI video rasters smaller than 1920x1080 typically coming from mobile phones, tablets, MS Teams or other web cams, BRIDGE NDI 3G will default to the “Scale” option under Individual Channel/Group Screen > Controls Column > Video > Video Convert, meaning it will scale the image to fit the HD raster using either letterboxing or pillarboxing to pad the rest of the image. Changing “Scale” to “Actual” will present the original raster on black within the HD raster.
- For NDI sources presenting non-SDI video rasters bigger than 1920x1080 but smaller than 4096x2160, BRIDGE NDI 3G will default to the “Scale” option under Individual Channel/Group Screen > Controls Column > Video > Video Convert, meaning it will scale the image to fit the 4K/UltraHD raster using either letterboxing or pillarboxing to pad the rest of the image. Changing “Scale” to “Actual” will present the original raster on black within the HD raster.

Note, BRIDGE NDI 3G will require a configuration change such that a Bank can support 4K before this will work as designed.

- BRIDGE NDI 3G does not perform ROI extraction. Scale up and letterbox/pillarbox only.
- BRIDGE NDI 3G does not currently have Closed Captioning support.
- When choosing a reference level for NDI, note that (for example) “20” means 20dBu attenuation.
- Using the system locally with the Kiosk Interface (via customer supplied VGA Monitor with USB Keyboard and Mouse) together with the supplied USB sound card, analog audio has a small click every 3 secs when listening to tone.
- I/O screen>Canvas and Control Bar>Video Setup tab; V+K groups do not always switch back to HD channels properly and sometimes the channel needs to be disabled and then re-enabled, or else the NDI source re-selected, for normal channel behavior to resume.

Access

- BRIDGE NDI 3G should arrive with DHCP enabled, meaning once connected to the intended network the system can be located via Mac or Win network browse. Alternatively, the system can be set up locally using the USB and VGA connectivity, and this allows for setting the IP address(es) manually. See Manual for more details.
- User management / password changes currently only support the “admin” user type.
- If the password is changed and subsequently forgotten, the only way to recover access will be to perform a factory reset and then use the factory password provided on the physical quickstart guide shipped in the product box. See the BRIDGE NDI 3G User Manual for more details. If you cannot locate the physical quickstart guide, contact AJA Technical Support.

Other

- In the local Kiosk Interface, System Setting Screen>Resources; if you open either “Product” or “Support”, after you are done, use the Keyboard Shortcut ALT + Left Arrow to return to the BRIDGE NDI 3G Interface.
- OBS Studio may crash on macOS if BRIDGE NDI 3G sends 16-channels of audio via NDI, to avoid this use the system default of 8-channels, or set to 2 channels.
- Microsoft Teams NDI output can intermittently exhibit A/V sync drifts.
- Microsoft Teams can/will cause flickering if NDI Discovery is on. To solve this there are controls on the Source/Destination Screen under NDI Network>Scan Mode:
    - “Off”: The scan and metadata gathering threads will sleep - and in the case of Microsoft Teams this will solve the flickering behavior.
    - “Only Names”: This will only use the NDI scan functionality which provides the NDI source name and IP address. In this mode there is only enough info to populate "In Use", "URL" and "Source Name" columns.
    - “All”: All columns will be populated (if a valid source is present).
- NDI playback from NLEs can intermittently exhibit A/V sync drifts, and timeline scrubbing can sometimes cause loss of NDI source.
- Currently if changing from 2SI to Quad using the individual Channel/Groups Screens it may be necessary to disable and re-enable the Channel/Group for the intended change to take effect.
- Bridge NDI drop-down menus in Firefox can sometimes be problematic. Use an alternate browser (e.g. Chrome) if necessary.
- When using FoMaKo PTZ NDI HX camera under NDI 5 and set to H.265 there is no compatible NDI to receive. The workaround is to either set the camera to H.264, or else run Bridge NDI under NDI 4 (vs NDI 5).

- When using some models of NDI HX3 cameras, BRIDGE NDI 3G will sometimes show repeated frames via SDI output.

Troubleshooting

- If a Channel/Group becomes badly behaved, first try fully disabling and then re-enabling that Channel/Group using the Individual Channel/Group Screen controls.
- If multiple Channels/Groups become badly behaved, try using the “Refresh App” button located on the System Settings Screen.
- For troubleshooting SDI I/O it is highly recommended to try at least two different SDI cables and two different upstream/downstream SDI devices/monitors, to make sure the problem is not a damaged cable or unreliable source/destination.
- Another SDI I/O verification test would be to take the SDI Output (HD) from one BRIDGE NDI 3G channel and loop this back to another SDI channel (HD) designated as Input on the same BRIDGE NDI 3G system. Check to make sure BRIDGE NDI 3G can properly auto-detect its own SDI Output.
- Verifying NDI sources on the same network as BRIDGE NDI 3G can be done with a tool such as NewTek NDI Studio Monitor. If NDI Studio Monitor can see an NDI source on the network, then BRIDGE NDI 3G on the same network should see it too. Likewise, if NDI Studio monitor cannot find an NDI source on the network, it's unlikely that BRIDGE NDI 3G will be able to, either.
- For troubleshooting network connectivity it is highly recommended to try at least two different Ethernet cables and unplug-replug the Ethernet connections into the Ethernet switch, to make sure the problem is not a damaged cable or a switch not refreshing correctly.
- If you are not receiving any data from BRIDGE NDI 3G on target devices, please verify that the network configuration (both for the BRIDGE NDI 3G unit and for your network devices) allows the unit to send data to your desired destination.
- If running under NDI v5, try running the same workflow under NDI 4 as a comparison, or vice versa. The NDI v5/v4 change button is present on the System Settings Page>NDI Version.

Downloading and Applying Software Updates from AJA.com

Although BRIDGE NDI 3G comes from the factory pre-installed with the latest software at the time of manufacture, it may be desirable or necessary to update BRIDGE NDI 3G with the latest software update package that has been posted on the AJA website. The steps required to upgrade AJA BRIDGE NDI 3G software are as follows.

Download the Latest BRIDGE NDI 3G Update

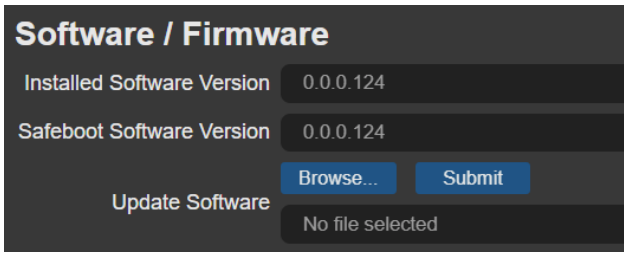
- The update can be obtained with a separate Mac, Windows or Linux-based host-system with a network interface and access to the internet. If you wish to apply the update from the same system you are using to download the update package, it will need to be connected to the same network as BRIDGE NDI 3G.

- Use a web-browser to reach:
    - https://www.aja.com/products/bridge-ndi-3g#support
- Under the Software heading, the BRIDGE NDI 3G package can be selected for download.
- Current and previous releases of BRIDGE NDI 3G will be available on AJA's website.
- Download the package you require to the separate host-system, connected to the same network as BRIDGE NDI 3G.

Unpack BRIDGE NDI 3G Update

- The update downloaded from AJA.com is a “ZIP” file, which can be opened with OS tools or third party applications.
- Extract the contents of the ZIP file (unzip). This will present a folder containing the BRIDGE NDI 3G Product Manual, Release Notes, and the appropriate Software update package.

Follow this procedure to update BRIDGE NDI 3G from a remote system



1. In BRIDGE NDI 3G (via Web Browser Interface) go to System Settings Screen > Software Update and click Browse.
2. Navigate to the unzipped Software update (*.ajas), select and click open.
3. Choose Submit.
4. Following reboot or restart, a login will be required.
   Note: Depending on your connection speed to the remote BRIDGE NDI unit, it may take some time before the update begins after choosing “Submit”.

Follow this procedure to update BRIDGE NDI 3G locally using a USB connected storage device

1. Copy the downloaded and unzipped update file to a USB drive.
2. Plug USB drive into the BRIDGE NDI 3G USB port.
3. In BRIDGE NDI 3G (via Kiosk Interface) go to System Settings Screen > Software Update and click Browse.
4. From the left hand OS navigation menu go to Run > Media > sda1.
5. Navigate to the unzipped Software update (*.ajas), select and click open.
6. Choose Submit.
7. Following reboot or restart, a login will be required.

NOTE: While updating software, do not remove power.

Technical Support

To contact AJA Technical Support:

Email: support@aja.com
Phone: +1-530-271-3190
Fax: +1-530-274-9442

Web: https://www.aja.com/support/contact
Shipping: 180 Litton Dr. Grass Valley, CA 95945 USA

Items helpful to Technical Support

- Issue description (as extensive as possible).
- Error messages.
- Details of the devices and software that are being used to receive from or send to BRIDGE NDI 3G's.
- Basic Network verification (e.g. do other devices and software see each other on the network).
- Network configuration.
- Screen shots, screen captures/videos.
- Provide a Support Log to AJA: System Settings > System Details > Support Log > Download
    - Download the support log using a remote system accessing BRIDGE NDI 3G via Browser Application, and this can be emailed to your support representative along with the other information described above.
    - Note there is no facility to download a support log locally via the Kiosk Interface; this must be done via a remotely connected host system.]