



SBT3-9840 and 9840C Avenir Mini 4 Series

SETUP AND OPERATION GUIDE

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Section I: Introduction and Hardware

1 Introduction

The Streambox Avenir Mini Series are mobile video encoders targeted for broadcast-level video/audio quality and challenging connectivity environments. The Mini 4 can be configured with up to 5 internal modems for a specified carrier region.

1.1 Avenir Mini Series HD/SD Portable Encoder

The Avenir Mini is a lightweight, small-form-factor encoder that is capable of delivering high quality real-time HD/SD video and near real-time HD/SD file-based video. Avenir Mini can deliver video over any IP network including Ethernet, Wi-Fi, and most Wireless Wide-Area Network technology - bonding up to five internal 3G/4G modems as well as up to 2 external USB modems. Avenir Mini contains many advanced features for ease of use and operation, including automated 3G/4G multiplexing and automatic bandwidth negotiation. Additional benefits for video quality and operation include automated HD/SD video selection, easy-to-navigate touch-screen interface, and a family of optimized smart-presets for delivering the highest quality video for best results. It includes a Wi-Fi user interface that can be used to access Avenir Mini's controls remotely using a Wi-Fi-enabled smartphone or other portable device. Additionally, technicians can connect to Avenir Mini over the internet to aid users in the field.

Avenir Mini has two built-in paths to transmit HD/SD video from the field. The direct connection allows Avenir Mini to send live video to a Streambox Decoder or Media Player, and transmit file-based video to a Streambox Enterprise Server residing in the broadcast studio or datacenter. As an alternative, Avenir Mini can utilize the Streambox Cloud cloud-based service to send both live and file-based video for real-time routing, archiving, and video sharing.

The Avenir Mini system can be fully integrated with other Streambox products such as the Streambox Cloud Service and the Streambox Store and Forward Server for centralized file-based acquisition and management. Avenir Mini works with Streambox Cloud Service for live streaming to the web, mobile devices, and desktops; it also handles uploading and managing HD/SD video files. The Avenir Mini is designed to shorten and streamline workflows for both live and file-based acquisition by offering field-editing features including play/pause, trim to selection, file deletion, and file uploading.

1.2 Streambox® ACT-L3™ Codec

The ACT-L3™ codec is an advanced video compression technology optimized for interlaced and progressive video and display systems. ACT-L3™ provides higher HD/SD video quality at much lower data rates than MPEG and H.264 compression. The ACT-L3™ codec is adaptable to user selectable data rate requirements with constant bitrate and variable bitrate modes.

The robust family of ACT-L3™ video transport solutions features innovative error correction and bandwidth shaping technologies that manage, control, and mitigate packet loss and correct irregularities common to video delivery over IP-based networks.

1.3 Avenir Management Workflows

Field Managed Workflow

In this workflow the Encoder settings and streaming options are set primarily by the field operator with quality feedback and queues given from the Station. Each field operator should be trained on the full functionality of the Avenir for quality optimization and troubleshooting.

Station Managed Workflow

In this workflow the Encoder settings and streaming options are set primarily by the Operator in the Station using remote control. The Field Operators need only to power on the Avenir and establish and verify network connectivity for remote control access. Each Station Operator should be trained on the full functionality of the Avenir for quality optimization and troubleshooting.

This workflow allows field operators to focus more on camera setup and placement while Avenir control and optimization is handled by the station operators remotely.

Solution Features

- Automated HD/SD live streaming.
- Near real-time high quality HD/SD store and forward video.
- Enhanced Low-Delay Multi-Path (LDMP) Transport gives consistent lower latency over multiple network connections.
- Integrated embedded hardware 3G/4G modems (4 modems in Avenir Mini 1 and Mini 2; 5 modems in Avenir Mini 4 and 4c; no modems in Avenir Mini 4c).
- Network connections including Ethernet and Wi-Fi and WWAN 3G/4G modems.

- HD/SD Video automation from selection, capture to delivery over bonded 3G/4G networks with Automated Bandwidth Negotiation (ABN).
- Smart presets for high quality, low-latency optimized video end-to-end delivery.
- SD-SDI, HD-SDI and HDMI inputs.
- Controls are accessible via touch screen LCD, or via local Wi-Fi using iPod Touch, iPhone, and iPad.
- Up to 90 minutes of operation from IDX or Anton-Bauer battery.
- Advanced HD/SD Encoder.
- IFB Audio reception.
- Works directly with all Streambox Decoders, Streambox Media Player, Store and Forward Server, Streambox Cloud Service and Enterprise Server.
- Imports ACT-L3 files from other Streambox Encoders for transmission with the built-in Store and Forward Client.
- Works with Streambox Cloud Service for many-to-many video sharing, routing, and file archiving.
- Remote Configuration allows distant technicians to optimize and support Avenir Mini over the Internet.

Figure 1 Avenir Mini 4 (front-side view)



Figure 3 Avenir Mini 4 (bottom view)



Figure 2 Avenir Mini 4 (top view)



2 Unpacking

When removing the unit from the packaging, take note of how the unit is packaged. All packaging should be kept, in case there is a need to ship the product to another location or to ship the unit to Streambox for repairs. Streambox does not warranty products that are shipped without original packaging materials.

2.1 Package Contents

- Streambox SBT3-98XX Unit
- AC Adapter (100-240V, 3 pins)

Optional Accessories

- 3G/4G Antenna (Optional)
- Shoulder Bag (Optional)

2.2 Storage and Transport

Store the Avenir Mini in a cool, dry place.

You may choose to store Avenir Mini in a foam-filled hard-exterior case, in which it may be easily transported in a shock-absorbing environment. Be sure to store other objects in the case in such a way that they cannot damage the screen of Avenir Mini, or penetrate the ports or vents.

When not in use, cover the unit with a dry cloth or towel taken extra care to protect the connection ports and air vent from dust.

2.3 Keeping Clean

To clean the display, power down the Avenir Mini completely, and use an ammonia-free glass-cleaner and a gentle lint-free cloth. Spray the cleaner on the cloth and use the cloth to gently wipe the glass surface of the display. Allow to dry and repeat as necessary.

The metal exterior of Avenir Mini can be cleaned with any mild household cleaner, taking care not to let any liquids get inside the chassis. Apply the cleaning agent to a cloth rather than directly onto the chassis. It is not necessary to polish the Avenir Mini.

3 Network Connections

Network connections allow the system to send an ACT-L3™ transport stream from the encoder to the decoder. All Streambox® units come standard with RJ-45 Ethernet connections for TCP/IP networks.

Ethernet can be connected using standard Ethernet cable, CAT-5, 5e, or 6. Connect the Ethernet jack to your network device using a category 5/6 Ethernet cable.

The Avenir Mini is also equipped with 802.11b/g/draft-N Wireless Ethernet (Wi-Fi) adapter which will allow connections to most public Wi-Fi networks as well as private networks equipped with Wi-Fi access points.

Finally, the WWAN (Wireless Wide Area Network) adapter aggregation feature of the SBT3-9840/9840C permits excellent connections to 3G and 4G (LTE) cellular data networks, which connect to the public Internet while within range of these networks. While coverage in urban areas is nearly ubiquitous (barring interference or blocked signals), coverage also common in rural areas, especially along highways, at major intersections, town centers, and other places where people assemble. External WWAN adapters are not included.

3.2 Inserting SIM cards

GSM (3G) and LTE (4G) modems use Subscriber Identity Module (SIM) cards to store user account and mobile carrier information required by the modem to connect to the carrier. These cards are provided by a mobile carrier.

Avenir Mini 4 has up to 5 modems labelled 1-2-3-4-5, which were selected at the time of purchase to correspond to the user's region and country. Not every SIM will work with every modem, so Streambox will assist the user in getting the appropriate SIM/carrier to the appropriate modem.

To insert SIM cards, find the small removable cover attached to one of the long edges on the opposite side from the LCD display. The cover is attached with 3 small screws.



The SIMs should be gently inserted with the electronic contacts on the bottom, and the angled notch to the left. Then gently push the SIM card into the unit and it should click into place. If the SIM card does not fit inside the cover, it may have been inserted incorrectly or it was not clicked into the SIM holder.

3.3 Utility Connections

Utility connections are used for administering the Streambox unit using the more convenient peripherals of a mouse and keyboard connected via USB, and a VGA monitor for clear viewing on a larger screen than the Avenir Mini's display.

- USB connections are provided to allow connection WWAN adapters for use with Avenir Mini's multiplexing feature. Two USB sockets on the top of Avenir Mini are recessed in a small compartment and are intended for this purpose. Four additional USB sockets are on the left side, intended for additional WWAN adapters, as well as USB peripherals, such as a computer keyboard and mouse for use with the graphical user interface. These connections can also be used to transfer files or a firmware update using a USB memory stick if necessary.

3.4 Encoder Connections

The SBT3-9840/9840C Avenir Mini is designed to accept high-quality digital video using common digital connections such as SDI and HDMI.

Video Input

This portable unit uses a BNC connector for a positive fit and reliable connection. To connect the video BNC connector, push the connector into the port and turn the connector clockwise until it is locked into place.

To connect the HDMI, orient the tapered side of the plug to correspond with the tapered side of the socket, and insert the plug gently but firmly for a smooth fit.

- **SDI** input accepts HD-SDI or SD-SDI signal using SMPTE 292/296 standard. This connection also accepts up to six channels of embedded SDI audio in 24-bit SMPTE-259 standard format in HD-SDI and up to six channels of SDI audio in SD-SDI.
- **HDMI** input accepts HDMI Type A connector for DVI-standard (CEA-861) video and Stereo PCM or IEC 61937-compliant compressed audio.

NOTE: If both types of connectors are connected, Avenir Mini will recognize the SDI source. **It is strongly recommended that only one source be connected at a time.**

Audio Input

The SBT3-9840/9840C requires that audio signals be embedded within the video signals using the HDMI or SDI connections.

3.4 Output Connections

Audio Output

The one Audio-only connection uses a 3.5mm stereo Mini-plug for use with the IFB Client. This port outputs analog audio for amplified speakers or unamplified headphones from the IFB client.

3.5 Power Connections

The main power connector is a standard four pin XLR power connection with a retainer bracket to prevent accidental removal. Use the provided cable for this connection and secure the retaining bracket. Avenir Mini is shipped with an AC adapter with in-line transformer, as well as an automobile accessory power adapter.

Battery

The SBT3-9840/9840C can be powered by industry-standard batteries such as IDX and Anton Bauer. These batteries are Lithium-ion rechargeable batteries, rated at greater than 14V, and come in a variety of sizes. The battery mates with the power supply using the standard V-Mount, optional Gold Mount, or an Adapter that converts one to the other. See Appendix C for a list of approved batteries and adapters.

Additionally, a “T-adaptor” is available to connect 2 batteries at once, allowing for the user to “hot-swap” a battery without interrupting a stream or recording.

Battery Life

With normal use, each fully charged battery should last for about one to two hours before requiring recharging. Note that using the Preview feature on the video screen will increase power draw.

Switching between AC Adapter and Battery

To switch from the AC adapter power to battery power, mount the battery to the Avenir Mini and then disconnect or unplug the AC adapter. The switch from the AC Adapter to the Battery power is seamless and automatic; no lapse in power will occur.

Likewise to switch from the battery to AC adapter, connect the AC adapter to Avenir Mini and plug it into an AC electrical socket. Once this is done, Avenir Mini immediately begins to run on current from the AC adapter and you may disconnect the battery without interrupting power.

NOTE: Connecting the AC adapter to Avenir Mini ***will not charge the battery.***

4 Turning the Unit On and Off

The SBT3-9840/9840C power switch is a rocker switch on the side panel near the USB and Ethernet connections.

4.1 Power On

Press the upraised half of the power switch and release. The switch will spring back into its original position.

4.2 Power On Sequence

As the unit starts it will go through three phases of startup.

1. **Power On Self Test (POST):** During the first phase of the power-up, the power indicator light should illuminate, all fans should start, and the front display should show the BIOS loading and testing memory.
2. **Operating System Loading:** During the second phase of power up, the unit will load its operating system.
3. **Software Startup:** During the third phase of power up, the unit will load the Streambox software. After displaying a white splash-screen with the Streambox name and logo, the front panel display will load the Home Screen.

NOTE: If using an AREM, please wait until Avenir Mini is fully powered and booted before connecting the AREM; this allows the modems to draw the power they need without competing with the draw required by Avenir Mini for power-up.

4.3 Power Off

Press the power switch as if to turn on the unit. The Avenir Mini will start a software shutdown process which will turn the unit off within ten seconds.

If you need to power down Avenir Mini immediately, press and hold the power switch for 6 seconds; at that time, the unit will shut down instantly. It is recommended that you always attempt a software shutdown described above before resorting to this “hard shutdown.”

4.4 Airflow

When powered on, the unit draws cold air from the top end (among the connections) and blows heated air out of the bottom fan port. The unit should be seated or carried so that airflow is not obstructed and air can freely flow through the unit’s top and bottom.

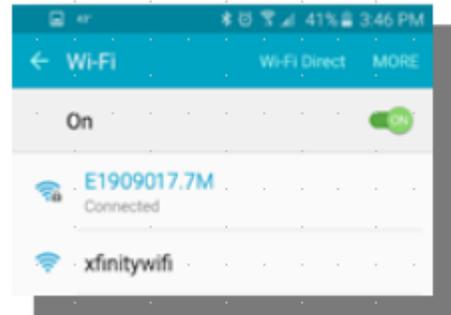
The internal fan will activate only when the unit’s passive airflow is not adequate to cool the components. It can also change speed. The fan has been selected for relatively quiet operation.

5 Accessing the Controls

5.1 Local Access Point Control

You can connect directly to a Mini 4 encoder via a peer-to-peer WiFi connection for remote control. Using a mobile device (iPhone/Android) or a computer with WiFi:

- From your smart-phone or other WiFi device, scan available WiFi networks (see image on right) for the Mini 4 device name (this will be the same as the serial number). Then connect to that device using 10 ones (1111111111) for a password.
- From the web browser, enter the URL <http://10.111.111.1> to access the Mini 4 device's web interface (see image below)
- Remember to return the remote device (phone or laptop) to the original WiFi connection when you are done.



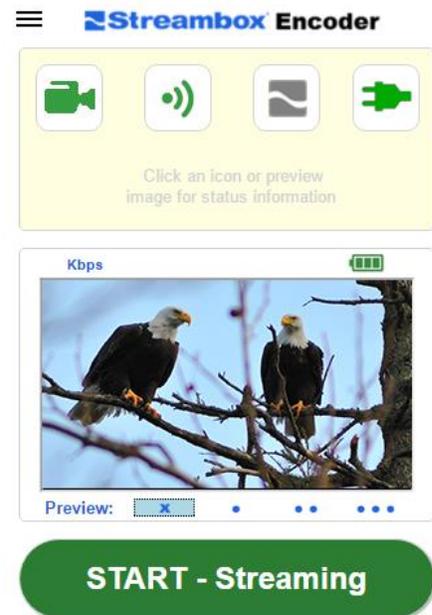
5.2 Mobile Web Interface

Streambox introduces a new simplified Mobile Web Application for remote command and control of Avenir 4 encoders. The application is web-based so it will work on any Internet browser. From your Internet browser, go to the remote configuration page ([http://10.111.111.1](#)) and enter the device's serial number (and password if previously set). In the dialog window that opens, select the Mini 4 button on the 'Remote Connection' line.

5.1 Home Page

The Home page of the Streambox mobile Web application for Mini 4 is divided into three segments (see upper image on right):

1. **Status Panel** – gives constant feedback about the state of the device; e.g., Camera/Format, IFB, Network, Stream, Power, and metadata information
2. **Preview Panel** – displays a preview video (with bitrate and power status display, and preview framerate control). Once calculated, Kbps and Power will be replaced with respective values/icons.
3. **START/STOP Button** – starts and stops the video stream



5.2 Dropdown Menu

A dropdown menu (upper left corner) offers access to other pages (see image on right):

4. **Settings** – allows you to change metadata (Title, Location, and Contributor), select settings presets, select decoder (destination), select networks to be bonded, and select a bitrate
5. **Pair Device** – allow you to pair this device with a Streambox Cloud account
6. **About** – provides information about the device and how to contact support

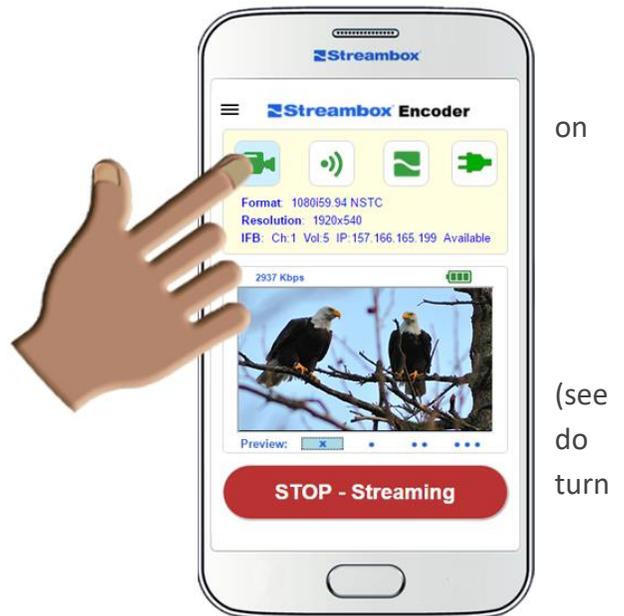


7. **Advanced** – takes you to the complete user interface for command and control (this is for advanced users or when directed by Streambox Support) **Display Status**

Most operations do not require any status display but sometimes it is helpful. There are two levels of status display.

General Condition

At the top of the Home page are 4 status icons: Camera, Network, Streaming, and Power (see figure right). If the icon is green, then that component is ready for streaming. If the icon is gray, then that component is not yet active (e.g., if streaming is stopped, the Streaming icon will be gray; see lower image). If an icon is red, then there is something preventing the component from working correctly (network icon in image below). For example, if you do not have Internet connection, the network icon will be red.



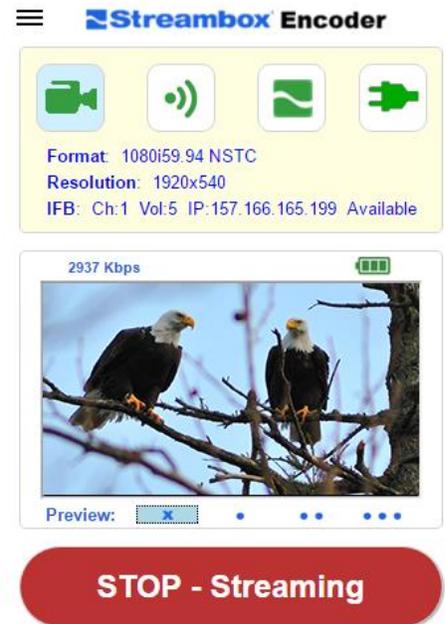
Specific Status

For each status icon and the preview image, there is additional information that is displayed when you click/touch that icon and/or preview image (see image below). When an icon or preview image is selected its background color will change to blue. Pressing the same icon again will turn off the specific status display.

Camera Status

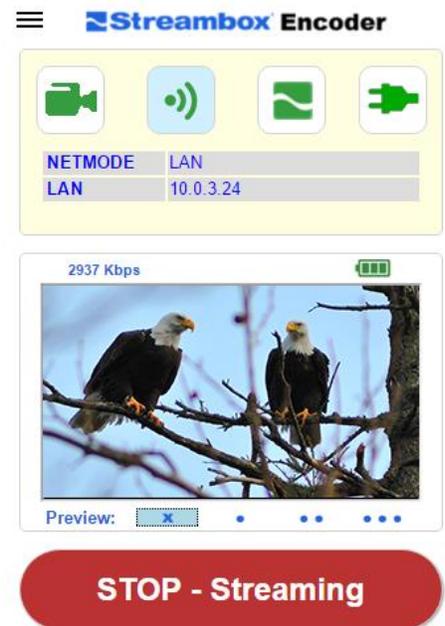
The Camera Status displays the incoming video format (e.g., 1080i59.94), standard (e.g., NTSC or PAL), and outgoing resolution setting (e.g., 1920x540 in the example here).

In addition, Camera Status displays the IFB (interruptible feedback) status. Most news agencies use an IFB channel to remotely communicate with the correspondent or photographer. IFB audio requires a special Streambox server. IFB settings can be modified from the Advanced user interface (from dropdown menu) or from the LCD interface.



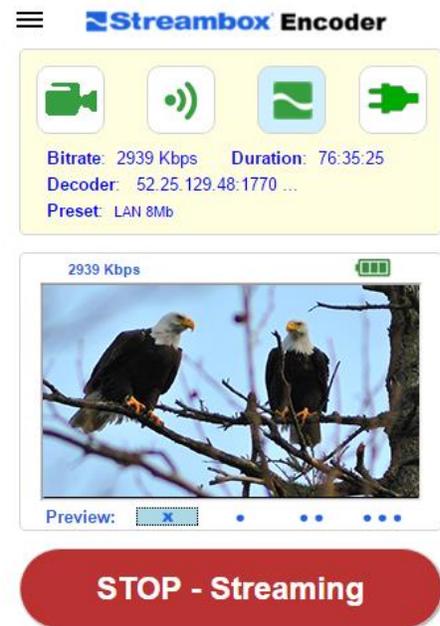
Network Status

The Network Status displays a table of available networks. The top row displays the NETMODE; i.e., which networks are being used to stream (LAN, WWAN, WiFi, and ALL; LAN in this case). Each network row starts with the type (e.g., LAN) or the provider (e.g., T-Mobile, Verizon, AT&T, etc.), followed by its IP address.



Streaming Status

The Streaming status displays current bitrate, streaming duration, decoder (destination IP), and the selected Preset.



The screenshot shows the Streambox Encoder interface. At the top, there is a hamburger menu icon and the text "Streambox Encoder". Below this is a yellow status bar containing four icons: a camera, a speaker, a network signal, and a power plug. Underneath the icons, the following information is displayed: "Bitrate: 2939 Kbps", "Duration: 76:35:25", "Decoder: 52.25.129.48:1770 ...", and "Preset: LAN 8Mb". Below the status bar is a video preview window showing two bald eagles perched on a branch. The preview window has a "2939 Kbps" label at the top left and a battery icon at the top right. Below the video frame, there is a "Preview:" label followed by a close button (an 'x' in a box) and three dots. At the bottom of the interface is a large red button with the text "STOP - Streaming".

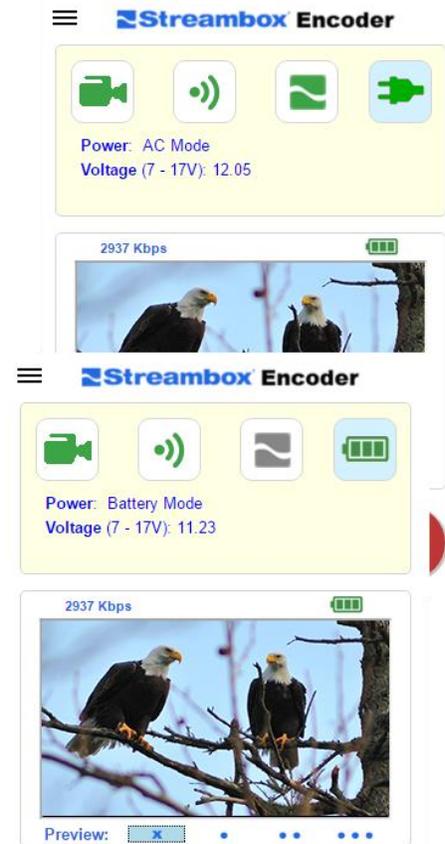
Power Status

The Power status displays the power type (e.g., Battery or Adapter Mode) and the voltage. The voltage must range between 7 and 17 volts DC. In the case shown here, the power type is battery (11.23 volts) in the top example and power adaptor (12.05 volts) in the bottom example. If you are on battery power, as you approach 7 volts (say 9 volts) you should replace the battery. If you are using a 2-battery system, in most cases, you can swap one battery at a time without interrupting a stream.

A quick view meter is displayed above the upper-right corner of the Preview (see red arrow). When on battery power, the status icon is a battery (see green arrow), and when using a power adaptor the status icon is a wall plug (see lower image).

Battery Quick Meter:

-  11+ to 17 Volts (green icon, *good*)
-  8+ to 11 Volts (yellow icon, *good*)
-  7 – 8 Volts (red icon, *low - replace battery*)
-  < 7 Volts (red-X icon, *under powered*)
-  > 17 Volts (green-red icon, *over powered*)

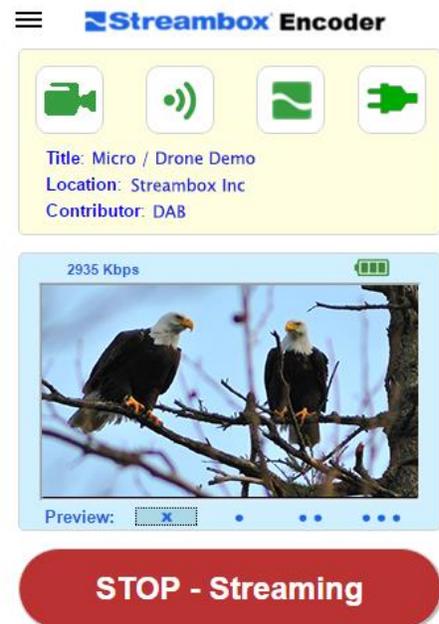


Preview Status

On the Home page is a video preview. The preview framerate is dependent on device and network capacity. Initially, it is always set to Off (x) to limit network burden. In the Off mode, the preview image is updated about once every 5 minutes. You can always update the image by clicking the X button. In addition, three framerates are available for preview: Low (1 dot), Medium (2 dots), and High (3 dots). Note, the higher the preview framerate, the higher the load on your network connection which could impact streaming over networks with low bandwidth.

Additionally, the streaming bitrate is displayed in the upper-left corner and is presented in kilobits per second (Kbps).

Touching/Clicking on the Preview image displays the Preview status. Here - Title, Location, and Contributor metadata are displayed.



5.3 Settings Page

The Settings page offers a place to change basic settings – those used most often (see top image). If, in the rare occasion you require a greater degree of command and control you can select ‘Advanced’ from the dropdown menu.

Settings Page

You can change the Title, Location, and Contributor in the upper panel of the Settings page. This is metadata that is passed with your video stream and helps identify one stream from another.

Preset: On the lower panel, you can change the Preset from a list of predefined settings that are used to characterize the video stream; e.g., bitrate, format, latency, etc. There are Presets for LAN and WiFi connections, and for Mobile (WWAN) connections, and some for Satellite connections. In the ‘Advanced’ interface, you can create new presets or modify existing ones.

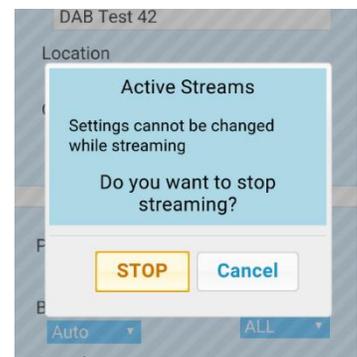
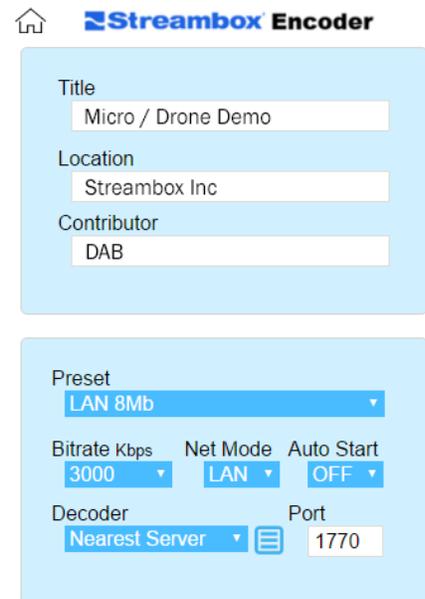
Bitrate: Even though the bitrate is defined in the Preset, you can override that by setting a new maximum bitrate here.

Net Mode: Net mode allows you to define which connected networks will be bonded for stream transmission; LAN, WiFi, WWAN, or ALL (ALL is recommended).

Auto Start: When Auto Start is ON, then streaming starts automatically when the unit is turned on.

Decoder: The decoder sets the destination of your stream. You can choose from one of the Streambox Cloud servers (see image to right) or you can add/delete your own server, decoder, or media player address (using the edit menu). You can also provide a port number where needed.

Active Streams warning: If you select the Settings page while streaming, you will be greeted with a message telling you that changes are not allowed while streaming – do you want to stop streaming (see lower image on right). Click STOP to stop streaming so you can make changes or Cancel to view the page without making changes.



5.4 Pair Device Page

Pair Device allows you to easily pair your Mini 4 device with your Streambox Cloud account. This allows you to pair your device and start streaming in minutes.

Pair with Cloud Account Page

The top panel lists the current Group Name (DRM). Once pairing is initiated, it usually takes a couple of minutes to view an update on this page. Once that occurs, you are set and ready to stream.

To pair, simply click the 'PAIR' button in the lower panel. Within a few seconds you will be provided with a pairing key. Log on to your Streambox Cloud account (click 'Live.Streambox.com' link; see red arrow), select 'Pair with Device' from the right-hand menu (see image on left). On the 'Pair with Device' page enter the pairing key and press the 'Pair Now' button. In a few minutes, your device will be paired with your Streambox Cloud account.

Streambox Encoder

Pair with Cloud Account
Pairing with a Cloud Account will automatically set Group Name to match your Cloud Account. Your current group is listed below.

Group Name: dab42

To Pair with a Cloud Account, click the PAIR button below - a Pairing Key will be generated. From the Live Channel on your Cloud Account, select 'Pair with Device' from the dropdown menu and enter the Pairing Key within 5 minutes.

PAIR

5.5 About Page

The About page is provided for support information (see figure below). It contains the contact information to call or email Streambox support and information about your device.

Streambox Encoder

Streambox® Inc. Support
Seattle, Washington, USA
support@streambox.com
206-956-0544
<http://www.streambox.com/support>

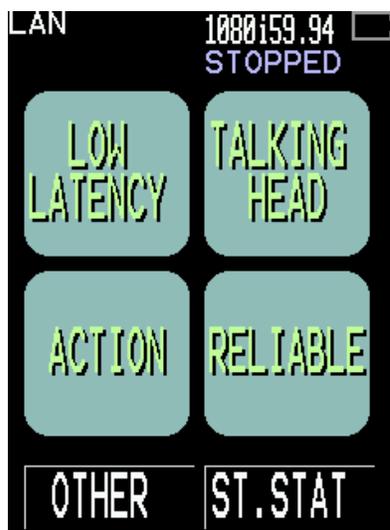
Serial Number: A00000000.00
IP Address: 10.0.3.24
Avenir Micro Version: 1.2.0
Encoder: ARM-3.163.75
Encoder Build: OCT-7-2016 20:57:21
Micro Web UI: 1.0.72
Group: dab42

6 Using the LCD Touch-Screen

Avenir Mini 4 features a compact touch-screen LCD display which allows the user to start live streams using the Smart Presets and a Custom Preset, view statistics about connectivity, change network for streaming, and view other information without requiring the full remote-control interface.

To press a button on the touch screen, gently press your finger or a soft, blunt stylus onto the screen on the region directly over the button.

Located on the side of Avenir Mini, the display initially features the Smart Presets of Avenir.



Home Screen featuring Smart Presets

NOTE: Always use a gentle pressure on the surface; increased pressure does not emphasize your intention or increase the priority of your command. If Avenir Mini does not appear to be responding, wait a moment and try your button-press again.

Additionally shown are the **OTHER** button, which links to an menu of settings and other operations, and **ST.STAT**, the Stream Status button.

At the top of this screen, the indicator in the upper left will show the current network setting used for streaming. Other network connections may exist, but the video stream *will only travel over the selected network*.

6.1 Other Operations



Other Operations Menu

The Other Operations Menu includes multiple links to information displays to assist the user in streaming using the Avenir Mini.

At the top, a **Restart Encoder** button will interrupt a stream and reset the Avenir Mini's encoder software to the state it was in before a stream was begun.

The **Params** button leads to an additional informational menu of unit parameters. See below for details on the parameters menu and contents.

The **Preview** button displays a view of the video source. This is useful for confirming that the source is working and framed correctly.

Click the **Color Mode** button to toggle the color in the preview video.

The **Params** button leads to the Parameters submenu with two buttons. The **SYS Info** button displays information about the Avenir Mini unit itself: Serial number, firmware versions, and disk space are found here. The **ENCParams** button shows settings currently in the Encoder software, such as video resolution for the output, network mode, maximum bitrate (during a stream), and audio codec setting.

The **WWAN** button displays the current status of the 4 embedded Wireless Wide-Area Network modems in the Avenir Mini.



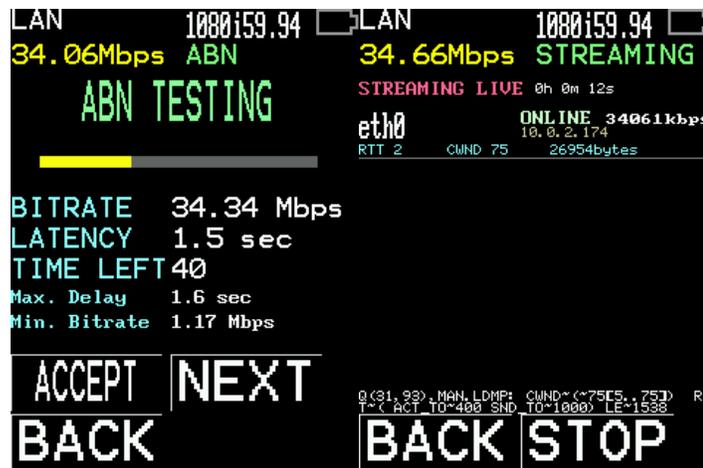
The **Stream** button displays current stream status. This is the same screen show when the **ST Stat** button on the homepage is pressed. On this screen, each network adapter in use for the streaming will be listed along with its current bandwidth and status.

The **Net Mode** button displays the 4 possible modes of network connectivity: **LAN** (wired Ethernet), **WIFI** (Wi-Fi Wireless Ethernet), **WWAN** (embedded and connected 3G/4G wireless modems), or **ALL** (any combination of existing connections).

The **LMSensor** button displays temperature information measured inside the Avenir Mini.

6.2 During Live Streams

The LCD panel reports live-stream statistics as well as the initial ABN process in a compact version of the remote-control Avenir interface.



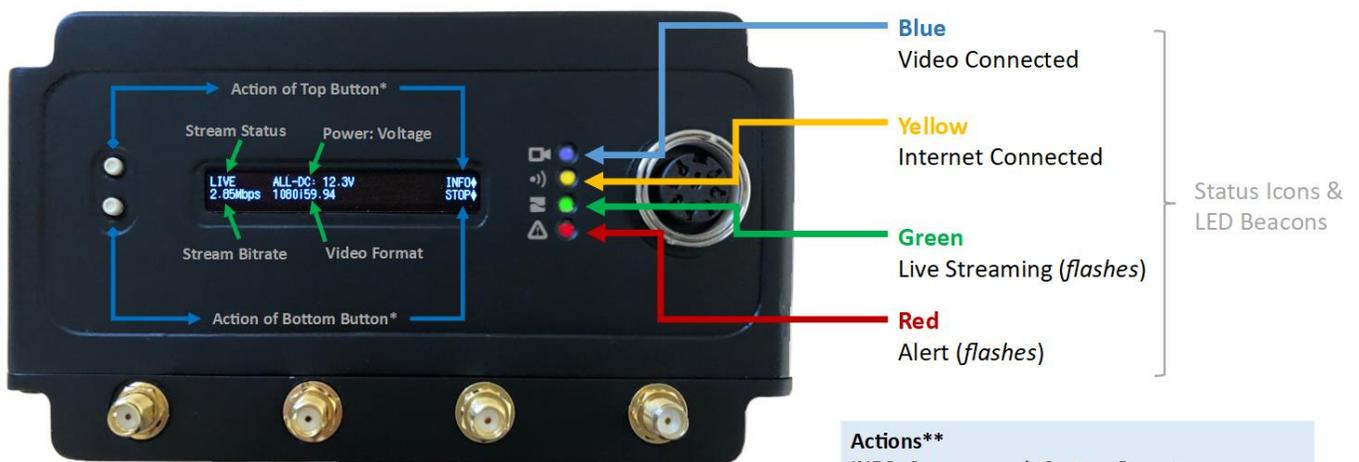
Auto-Bandwidth Negotiation (ABN) and Streaming Status

Once a stream is begun, the LCD panel will automatically display the ABN process followed by the Stream Status display. In this display, each network adapter and its contributions to the transmission of the stream are shown. Some adapters may say they are “OFFLINE.” This does not necessarily mean that they are not connected to the network, but that the connection to the Decoder through that adapter has a higher latency than is allowed by the current settings.

7 Using the Small LCD Menu

In addition to the touch-screen on the side, there is a small LCD display on top of Avenir Mini 4, with plenty of useful information that can be read at a glance.

4 LED indicators help indicate the status of the video source, network connectivity, streaming, and can



* Micro is position responsive so the Top Button is always the button on the top

Actions**
 INFO: 2 sec press → Custom Preset
 INFO: Single press → Network IP's
 STOP: Single press → Stop streaming
 START: Single press → Start streaming
 START: 2 sec press → ABN Preset

** State changes require active video and network connections

also indicate if the system is experiencing a problem.

7.1 Home Page – Ready to Stream Video

Notice that the green LED beacon is off since the unit is on standby and not streaming. Also notice that the Network Contribution and Bitrate Meters are off since there is no active stream.



8 Action Items & Navigation

8.1 Right-Side-Up View

Action items are designated by a diamond (◆). There can be 1 or 2 action items on a page; each corresponds to its respective top or bottom button. On the Home page, MENU is the only action item and is here associated with the bottom button.



8.2 Upside-Down View

If you rotate the device upside-down, the screen will rotate its orientation to remain upward and the buttons will flip so that the bottom button remains on bottom relative to the screen orientation. Right-side-up or upside-down, the MENU item on the Home page is always activated by pressing the on bottom button.



8.3 Two Action Items

In the example below, there are 2 Action Items, HOME (associated with the top button) and NEXT (associated with the bottom button). In most cases the top button executes an action and the bottom button navigates within a screen. So in this example, the top button executes the command to open

the HOME page and the bottom button navigates along the bottom row of tabs (notice that LAN is highlighted).



9 Main Menu

The Main Menu page is displayed when you press the MENU button (top) on the Home page. On the Main Menu page there are two Action Items; ENTER and NEXT. NEXT cycles through the seven menu items, and ENTER executes the highlighted item; [Start] in this case.



9.1 Main Menu Items

- **Start/STOP** — Start or Stop, respectively, the video stream and return to Home page
- **Preset** — Open the Presets selection page
- **IFB** — Open the IFB page
- **Decdr** — Open the Decoder page
- **Info** — Open the Info page
- **Sys** — Open the System page
- **Home** — Open the Home page

Start/Stop Video Stream

The **Start** and **STOP** action items start and stop the video stream, respectively. If video is streaming, Stop will be the item. If in standby, Start will be the item.

Presets Selector

Presets are predefined video streaming profiles. The Micro/Drone comes with a number of presets; some optimized for LAN & WiFi connections, some optimized for 3G/4G/LTE connections, some

optimized for satellite connections, etc. You can create your own Presets via the advanced web interface (discussed in a separate document).

To move up the list of Presets, you select the [+] item, and to move down the list you select the [-] item. Remember, pressing ENTER executes your selection. Once you see the desired Preset displayed in the top row (*Talk* in this example), you NEXT over to the [Apply] item to apply the Preset or you can NEXT over to the [Stream] item to apply your selection and start streaming with that Preset (see image below).



Smart Presets

There are 3 Smart Presets that are included in the Preset list. They employ ABN (see next section) to determine the optimal bandwidth settings based on your Internet connection.

4. **Talk** — Talking Head is optimized for in-person interviews with little action
5. **Action** — Action is optimized for action or high-motion shots
6. **Reliable** – Reliable is optimized for highest quality at the expense of a longer

latency

Automatic Bandwidth Negotiation (ABN)

Automatic Bandwidth Negotiation or ABN is an automated process to determine the best bandwidth. ABN is activated when using Smart Presets (see previous section). Once ABN is activated, you can press ACCEPT (lower button) when an acceptable bandwidth has been reached or you may allow ABN the full time to determine the best bandwidth available. In this example (see figure below), the bitrate is 5.43 Mbps with a 1.2 second latency and there are 13 seconds remaining in the ABN process for determining the optimal settings.



IFB Manager

Streambox Micro/Drone encoders support IFB audio. IFB is an abbreviation for Interruptible foldback or feedback. This is used by news agencies to communicate to field reporters during live interviews. IFB

requires a Streambox IFB server and access to the web interface to set parameters (covered in a separate document).

From the IFB page you can change the audio volume up or down ([VOL+] or [VOL-]), or change the channel up or down ([CH+] or [CH-]), and/or [START] an IFB connection. If the 'Offline' status is displayed on the top line, then there is no IFB connection and the [START] action item is displayed (see upper image below). If an IFB connection is already started, as indicated by a 'Receiving data...' status on the top line, [STOP] will be displayed to terminate the IFB channel connection (see image below).



9.2 Decoder selector

The Micro/Drone is by default setup to stream directly to the Streambox Cloud servers that are stationed throughout the world (e.g., LiveUS (US West), LiveUEst (US East), LiveAU (Australia), LiveDE (Germany), LiveEU (Europe), LiveJP (Japan), LiveSG (Singapore), LiveIN (India), and others). You can also set the Micro/Drone encoder to stream directly to a Streambox decoder (software, rackmount, NODE™) or Streambox Enterprise Server via the web interface (discussed in a separate document). Use the up [+] or down [-] action items to select the desired decoder (closest to your location). Then NEXT to the [Set] action item to set the decoder. Remember, use the ENTER, top, button to execute the selected item.



9.3 Info Page

The **Info** page provides system information. NEXT to the desired item and the respective status is displayed on the top line (in the example below, [LAN] is selected and the LAN IP address is displayed, indicating a LAN IP connection). At any time, you can return to the Home page by pressing the HOME (top) button.

8. **LAN** — LAN IP address



9. **WiFi** — WiFi IP address (in this case, since the device was not connected to WiFi, no IP is displayed).



10. **Temperature** — This is CPU temperature in degrees centigrade. Temperature is provided for diagnostic information. As a general rule, CPU temperature should stay below 100°C.



11. **Power** — Power provides info about the connected power supply. In this case, the attached power is 12.0 VDC. The functional power range is 7 to 17VDC.



12. **Date** — System date and time are displayed (for product support purposes).



13. **S/N** — Serial number is displayed. Also, LCD version is displayed (for product support purposes only)



9.4 System Menu

The System menu is similar to the Info menu but with items less often accessed by the user.



System Menu Items

- **Main Menu** — Return to Main menu
- **Net** — Network Mode selector
- **Encoder** — Restart encoder page
- **LCD** — Screen settings page
- **BATT** — Battery type selector
- **OTHR** — Reset LAN for Auto IP assignment (DHCP), Enable OTG Net

Network Mode Selector

Network mode selector sets which network connection the Micro/Drone uses; by default, **ALL** is selected so the Micro/Drone will bond all available networks together to improve bandwidth. You can also select LAN (for LAN only – as in this example), WiFi (for WiFi only), and WWAN (for mobile modems only). Use the **[Mod+]** and **[Mod-]** to change mode and then **[SET]** to make it so.



Encoder

From time to time it may be necessary to restart the encoder. Press the bottom, RESTART, button to initiate a restart and the top, HOME, button to return to the Home page. Often, powering the unit off and then on again is a more practical approach.



Screen Settings

The LCD (or OLED) page allows you to adjust contrast ([Cnt+] and [Cnt-]), invert the display from white-on-black to black-on-white ([Inverse]), or lock auto screen rotation ([Rotation]).



Battery Type Selector

It is necessary to know what type of batteries are being used for the power meter on the Home page to properly report the state of the battery condition. You can simply move up [+] the list or down [-] the list until you find the battery type that best matches the ones in use.



System Access (Other)

This is provided for product support access to system files via OTG Net. Also, LAN->DHCP may be used if the unit is locked out of a local area network due to IP conflicts.



10 Advanced Menu

SBT3-9840/9840C's Advanced Menu will guide you to your required workflow or settings with just a few taps on the screen. The menu hierarchy is intended for simplicity, and the current location in the menu system is always identified on the screen.

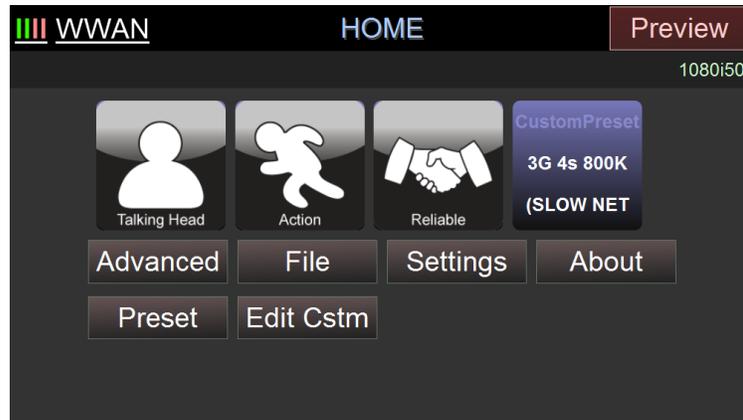
The top center of each screen gives the descriptive name of the screen.

In the upper right corner of this and many other screens, there is a Preview button. This button is visible at all times, no matter what menu is displayed. Click this button to preview the video as it appears from the source. Select Preview again to disable the preview and return to the menu from which you came.

Below the Preview button, some text appears, describing the format of the video source detected by Avenir Mini. HD Inputs indicate the provided frame rate as well. If no source is provided, the phrase "NO VIDEO INPUT" will appear.

In the upper left corner, the current selection for the type of Network connection is displayed. Sometimes, one or more red or green bars will be displayed, corresponding to disconnected or connected network adapters. Additionally, a stream bitrate value may appear next to the network connection type will appear.

10.1 Home Menu



This is the Avenir Remote Home Screen.

You can return to the Home screen from any other screen, tap the Home Icon  in the upper left corner.

The Avenir Mini Home screen defaults to LIVE streaming mode with 4 selectable use profiles called Smart Presets. (See section 8: *Live Streaming* for a description of Smart Presets.)

The user may also choose to enter Advanced mode, File mode, Settings, or About page from the home screen.

- **Advanced:** This is the legacy mode, used for custom live streams and testing, where quality can be evaluated and optimized, or for creating custom Live Stream presets; this mode allows manual selection of all encoder settings including bitrate, resolution, audio codec, and FEC.
- **File:** This button will let you record video and assist you in transmitting the file over your network connection, either now or at a future time when network connectivity has improved.
- **Settings:** This button takes you to the global settings for the SBT3-9840/9840C, such as network and decoder settings, server connections, input settings, and restarting the software or operating system.
- **About:** This button provides version information for the software and operating system, which may be requested by Streambox or other support personnel.
- **Preset:** Directly access a pre-made preset. Avenir Mini comes with a basic set of presets but the user can make more to fit the local network conditions and Avenir usage. See Section 8.3.
- **Edit Cstm:** This button opens the manual settings so the user can create a Custom Preset to appear on the Home screen, or select an existing preset to appear there.

11 Live Streaming

The SBT3-9840/9840C is purpose-built for high-quality live video streaming from anywhere network connectivity is available, while being carried and operated by a small crew or a single person. To begin a live stream, connect a video source and press a Smart Preset button.

11.1 Smart Presets

The Smart Presets contain settings appropriate for four different scenarios for using Avenir Mini:

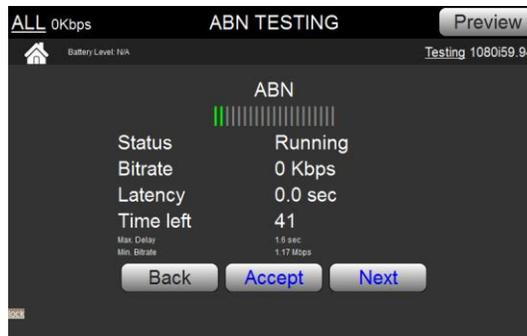
Talking Head: Use for low motion content such as live fixed location reporting with tripod; reduced latency, higher quality.

Action: Use for high motion video such as sports; higher frame rate, lower resolution, and reduced latency.

Reliable: Use under adverse networking conditions; includes a slightly lower data rate and higher delay due to increased and error correction.

Automatic Bandwidth Negotiation (ABN)

Automatic Bandwidth Negotiation examines your network connection and sends out some short signals to determine how much fast bandwidth is available.



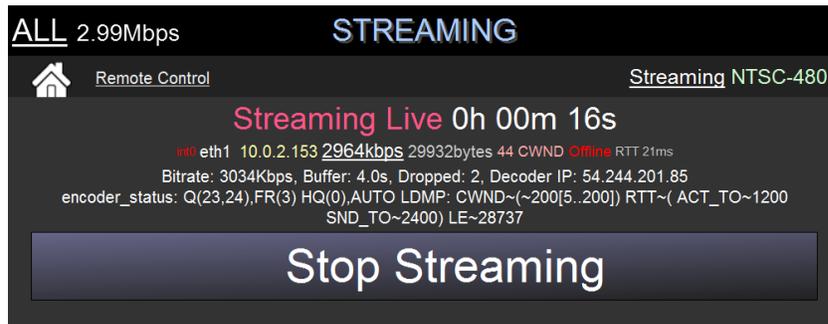
After you press a Smart Preset button, the Automatic Bandwidth Negotiation sends signals to the Streambox Decoder, and receives signals in return, measuring the speed and return time of the data exchanged in order to find out much bandwidth the Avenir Mini can deliver while still giving low-latency performance. ABN cycles through numerous possible settings for the LDMP Transport to find a setting that exceeds a Minimum threshold for bitrate, and falls below a maximum threshold for latency.

ABN typically cycles through about 5 possible levels of settings.

NOTE: It is recommended that the user **does not press the Accept button** unless Avenir Mini is being used under known, static network conditions.

The ABN period is 45 seconds by default, but that may be changed in the ABN settings. Streambox does not recommend that you change the ABN period unless you are absolutely confident that you can manually select the best settings using the Next and Accept buttons.

11.2 Live Stream Status Display



Whether automatically set, pre-set, or manually set, the network and video signal settings are displayed on the screen for your reference.

Each network adapter in use will have a status line displayed on the Streaming screen. First in the line is the network adapter identifier, according to the Linux system of identifying network adaptors; eth for Ethernet (LAN), WLAN for Wi-Fi, and PPP for a USB WWAN adapter. Following that is the encoder IP address, the bitrate currently being transmitted, and the number of bytes sent so far. Next is the CWND, the current Congestion Window for this adapter, the status of the adapter (Online when the adapter is in use, Offline if the adapter is not responding or the latency is too high) and finally RTT, the measured round-trip time or latency of the connection.

After the individual network adapter lines, the overall status of the stream is displayed. The first item is the transmission bitrate setting in kilobits per second (kbps). Bitrate is the main factor for quality of the transmission, higher being better. Following that is the Encoder Buffer, which elsewhere may be referred to as Encoder Latency or VBR, and it is measured in seconds (s). This represents the built-in delay added by the encoder software to improve the compression of the ACT-L3 video before sending the video frames.

“Dropped” indicates dropped encoder frames; it should remain zero or fixed after stream startup in most cases. If this number starts climbing, then the video-encoding software could be malfunctioning. If the Prefer Quality Over Framerate feature is being used, this may be increasing due to low-quality frames being dropped.

NOTE: Sometimes a few frames are dropped at the start of a video capture, but as long as the number is not increasing, there is nothing to be concerned about.

Following dropped frames is the Decoder IP, which is the address at which the Streambox Decoder or Streambox Media Player is receiving your live stream.

The second status line contains some technical diagnostic information, including a [summary of encoder switch settings](#), a [summary of LDMP settings](#), and ending with a [measurement of latency](#) from encoder to decoder, measured in milliseconds.

In the center of the screen you have a timer measuring the duration of your live stream, and a large button to stop the stream.

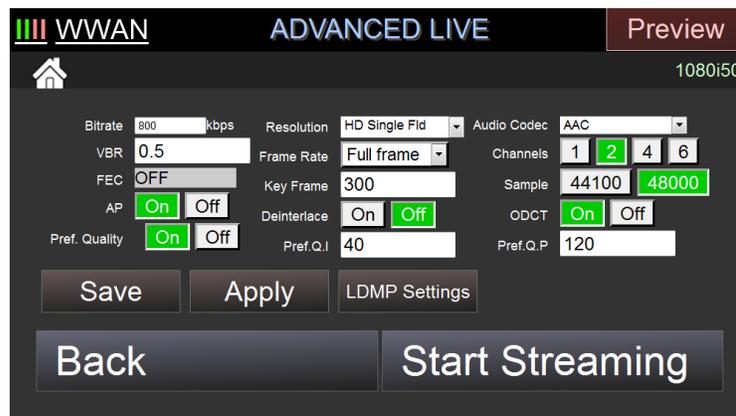
In the upper left corner of the screen, next to the Network adapter, is the instantaneous bitrate of the live stream. This number should be near the intended bitrate, but it may fluctuate.

11.3 Advanced Configuration

The **Advanced** button will take you to a settings page that allows for detailed customization of your settings for this screen. Unless you are experienced with stream optimization, or you are instructed to do so by someone with experience, you should avoid these settings. It is very easy to turn a good stream into a bad one by mis-adjusting these settings.

If you choose incorrectly, click the Home Icon  in the upper right corner, and you will return to the top of the menu.

Advanced Settings



On the Advanced Settings screen, you can adjust any setting to optimize the live video streams sent from the Avenir Mini. This screen is most useful for creating custom presets, but an experienced user can use it to fine-tune the stream to adjust for local network conditions and audio/video quality at the receiving end.

Bitrate

The specified value is the total bitrate for audio, video and FEC, as well as any IP overhead.

VBR

Encoder processing buffer, in seconds. This setting allows the Encoder to distribute bits within a specified buffer to improve video quality. A lower setting decreases latency while a higher setting improves video quality.

AP (Advanced Profile)

Enables Streambox key-frameless codec, ACT-L3™ Advanced Profile Codec, which requires special decoder software. Unless you are certain you are using the Advanced Profile Decoder software on your decoder, do not enable this setting.

FEC (Forward Error Correction)

FEC works to reduce & recover lost packets due to varying network conditions. This setting refers to the number of redundant packets sent to compensate for variable network conditions. FEC can decrease the bitrate of the audio/video signal in order to maintain the maximum bandwidth. For example; a 5 Mbps stream with 20% FEC will allocate 80% (or 4Mbps) to the audio/video stream and 20% for FEC packets.

FEC Reed-Solomon is a FEC specifically for burst error protection involving multiple packet loss. For example, a setting of 'R-S 64/10' can recover from up to 10 random or sequential packets lost in a group of 74 (64+10) packets. Burst FEC is denoted as "R-S x% (D/F)" in the Encoder interface, where D stands for number of data packets, F stands for number of FEC packets, and x% is the percentage of the data stream that will be consumed by Burst FEC.

NOTE: FEC will add latency to the transport. This additional latency is dependent on the amount of packets included in FEC and the amount of video data in each packet. For example, every 2 FEC packets at 256 Kbps, will add about 1 frame of latency. In this case FEC Reed Solomon - 32/2 adds 34 (32+2) packets or about 16 frames delay.

Resolution

Different video resolution options are available to achieve the best video quality based on the content type, amount of motion, and the available network bandwidth. The captured and encoded horizontal resolution is scaled based on the incoming video format. Avenir Mini will automatically offer SD options when an SD video source is connected, and HD options when an HD video source is connected.

Resolution in Standard Definition

The Standard Definition capture resolution at which the ACT-L3™ Transport encodes video may be adjusted below full D1. It may be necessary to lower the capture resolution during low bandwidth transport to produce acceptable video quality. Video bitrates below 1.5 Mbps may need less than full D1 capture resolution to create acceptable video quality.

- **Full D1** 720 x 480/576 resolution
- **3/4 D1** 528 x 480/576 resolution
- **2/3 D1** 480 x 480/576 resolution
- **1/2 D1** 352 x 480/576 resolution

- **CIF** 352 x 240/288 resolution
- **QVGA** 320 x 240/288 resolution
- **SD Single Field** 720 x 240/288 resolution

Resolution in High Definition

The High Definition capture resolution at which the ACT-L3™ Transport encodes video may be adjusted below full HDTV resolution. It may be necessary to lower the capture resolution during low bandwidth transport to produce acceptable video quality. Video bitrates below 8 Mbps may need less than full HD capture resolution to create acceptable video quality.

When source is 1080i:

- **Full HDTV** 1920 x 1080 resolution
- **3/4 HDTV** 1440 x 1080 resolution
- **2/3 HDTV** 1280 x 1080 resolution
- **1/2 HDTV** 960 x 1080 resolution
- **HD Single Field** 1920 x 540 resolution (progressive)

When source is 720p:

- **Full HDTV** 1280 x 720 resolution
- **3/4 HDTV** 960 x 720 resolution
- **2/3 HDTV** 800 x 720 resolution
- **1/2 HDTV** 640 x 720 resolution

Frame Rate

The frame rate at which ACT-L3™ Transport encodes video may be adjusted below full frame rate. It may be necessary to lower the frame rate during low bandwidth transport or when a higher quality still image is required. Video below 1.0 Mbps may need less than full frame rate to create acceptable video quality. The values reflect a fraction of the current frame rate. For example, at NTSC 29.97 frames per second, 1/2 Frame-rate yields a frame rate of 15 frames per second.

- **Full Frame-rate** 30 NTSC / 25 PAL frames per second
- **3/4 Frame-rate** 22.5 / 18.75 frames per second
- **1/2 Frame-rate** 15 / 12.5 frames per second
- **1/3 Frame-rate** 10 / 8.3 frames per second
- **1/4 Frame-rate** 7.5 / 6.25 frames per second
- **1/5 Frame-rate** 6 / 5 frames per second
- **1/10 Frame-rate** 3 / 2.5 frames per second

Keyframe

Key frames are video frames encoded without reference to any images in another frame. ACT-L3™ Transport will automatically create key frames when needed. The keyframe value determines the **maximum** amount of frames to be encoded before key frame creation is forced. The default maximum keyframe value is 300 frames. This setting should not be modified during normal optimization. (When AP is enabled, this setting is disabled.)

Deinterlace

Select if the video should be deinterlaced prior to encoding. If this setting improves your video output, it's possible the field order settings on the decoder need to be changed. Generally speaking one should not need Deinterlace turned on.

Audio Codec

Audio is captured in the encoder and then converted to digital format, compressed, and sent using ACT-L3™ Transport. Various audio codecs may be used depending on the desired audio quality and application. Audio bandwidth is subtracted from the overall ACT-L3™ Transport stream resulting in a minor trade-off between audio and video quality in some cases.

- **AAC Audio Codec:** The AAC audio codec is the highest quality audio available with the ACT-L3™ Transport. The maximum audio bitrate is 64 Kbps per channel. AAC is the only option which allows for 6 (5.1) channel audio.
- **GSM Audio Codec:** The GSM audio codec delivers medium quality audio for lower bandwidth usage. Using GSM audio will allow for lower latency over the ACT-L3™ Transport. This codec only supports mono audio (single channel).
- **AAC Low Bitrate Audio Codec:** The AAC low bitrate audio codec delivers lower quality audio for lower bandwidth usage. This codec only supports mono audio (single channel).
- **GSM Low Bitrate Audio Codec:** The GSM low bitrate audio codec delivers lower quality audio for lower bandwidth usage. This codec only supports mono audio (single channel).
- **CELP Low Bitrate Audio Codec:** The CELP low bitrate audio codec delivers lower quality audio for the lowest bandwidth usage.

Channels

The number of audio channels captured and sent using ACT-L3™ Transport may be set on the encoder. Each audio channel uses bandwidth, and thus there is a minor trade-off between the number of audio channels and video quality. When in single channel mode, the first channel, or left channel is transported only.

Sample

Audio Sample Rate, in kilohertz (kHz).

ODCT

Overlapped DCT Filter. Enable this at very low bitrates, such as below 200kbps.

Pref. Quality

Prefer Quality over Framerate. This setting, when enabled, will score every encoded frame of video for quality, on a scale of 0 to 300, 0 is the highest quality score; 300 is the lowest. The score is compared to the quality thresholds (Pref.Q.I and Pref.Q.P) and, if the score is worse, the frame will not be transmitted.

NOTE: The Prefer Quality Over Framerate feature will **deliberately drop frames** if the quality settings are set too high for the available network bandwidth. This feature should primarily be used for bitrates below 1Mbps.

Pref.Q.I.

Sets the quality threshold for i-frames (inter frames, better known as key frames). Recommend setting: 40.

Pref.Q.P

Sets the quality threshold for p-frames (predicted frames), the frames that go between the i-frames.

Press “Start Streaming” to commence the Live Stream.

11.4 Presets

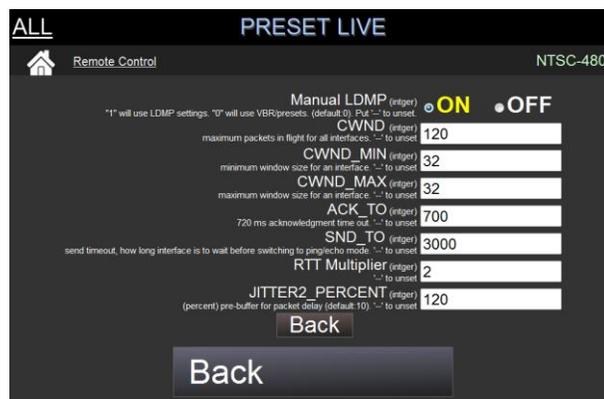
Selecting the Presets button for live-streaming will display a list of stored presets, or prepared groups of quality settings. Here you may edit or delete presets. Select a preset and five buttons will appear. Press Edit to rename or to examine the contents of a preset, Up or Down to change the order in which the preset is displayed. Delete will remove the preset; there is a confirmation prompt before deletion. The CustomP button will set the selected Preset into the Custom Preset button on the Home screen.



Editing a preset is the same as creating a manually-set stream through the Advanced button, described above, but the preset has a field for a Preset Name, and a link to adjusting LDMP settings to be stored with the preset.

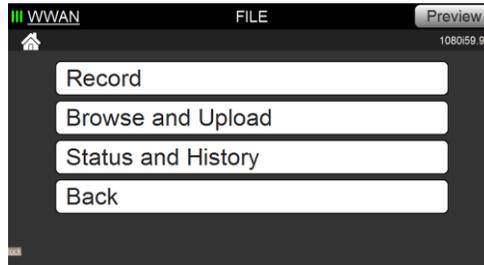


Click the “edit” link in the bottom center to create custom LDMP settings.



12 File Recording and Sending

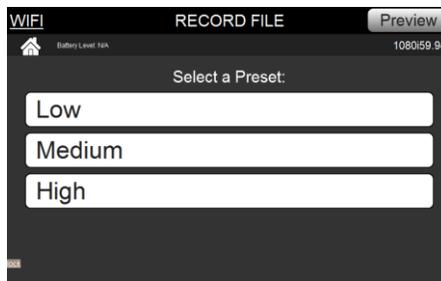
If streaming live is not an option or not desired, you can record your video as a file and upload for play out later on. By recording your file, you can increase the recording quality settings, including bitrate. High bitrate recordings can generate very large files, a fact to keep in mind when considering how and when you'll be transferring the file for later playback.



12.1 Record a New File

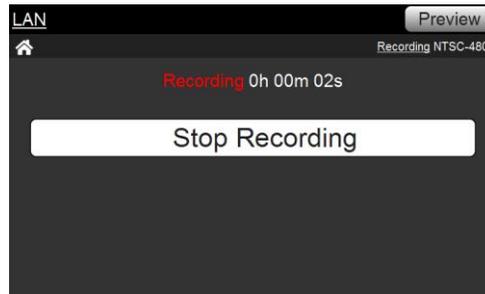
File recording is just as simple as Live Streaming, and it begins with presets. In this case, quality settings will be higher in general, and error correction is not an issue because files can be transferred at any speed with the built-in error correction of any file-transfer system.

Presets



Pressing the Record button will take you directly to the presets screen. Selecting a high bitrate will make for large file size, but the will be proportionally increased. These Presets cannot be changed by the user.

Start Recording



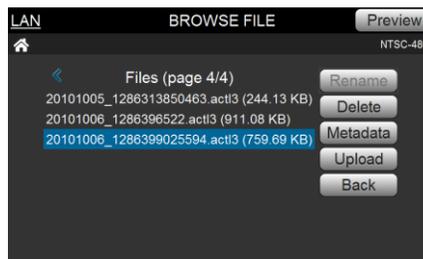
This next screen will make it clear that recording is underway and lets you know what preset you are using/at what bitrate you are recording, along with the elapsed time.

Stop Recording

The recording saves automatically as you record. Press the Stop Recording button to end the recording and save the video file. The file will be named automatically as well, based on the date, video settings, and timestamp. However, you will be able to rename the files by using the built-in file browser.

12.2 Browse and Upload Files

The Avenir Mini has a built-in file-browser which will let you delete or rename files, and edit the metadata contents of the each stored file. Additionally, this is where you navigate to upload files to the Store and Forward Server or other destination set up in the Avenir Mini Settings. Use the left and right arrows to display additional files, and tap on the file name to select the file.



- Rename: Select a file and press Rename to change the filename.
NOTE: do not change the .actl3 suffix, as this is necessary for other machines to recognize the file-type.
- Delete: Select a file and press Delete to erase the file permanently.
- Metadata: Select a file and press Metadata to change the Metadata fields associated with this file.
- Upload: Select a file and press upload to use the current network connection to send the file to a destination determined by the "SFS Settings menu," either a Store and Forward Server or Streambox Cloud Server.
NOTE: If uploading to Streambox Cloud, it is important that the Metadata fields are all filled in, and that the Group field matches the "DRM" code of your organization.
- Exit: Return to the main File Menu.

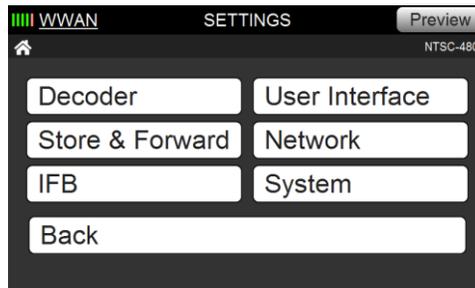
12.3 Status and History



The Upload screen displays the progress of the current uploads, and allows you to quit or resume the upload, if the upload is interrupted. You can also view previous upload attempts and whether or not they were successful by tapping the History heading. While viewing the upload history, select “Clear History” to clear out all entries in the list. Return to the Active Transfers view by tapping “Active Transfers.”

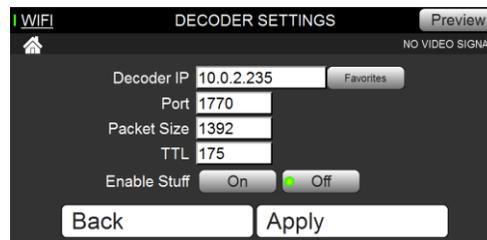
Press “Back” to return to the File menu.

13 Basic Settings



From the Home Menu, select Settings to configure Avenir Mini for use in the field. This section will include settings for Avenir Mini to send streams and files back to the production facility, server connections, configuring inputs and outputs, network setup, and some basic system functions.

13.1 Decoder Settings



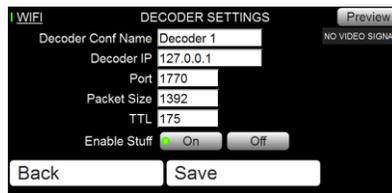
On the Decoder Settings screen, enter the IP address and port number (default is UDP 1770) for a target decoder which will be available to receive your live streams. **Unless instructed to by a Streambox Support Technician or a Network Engineer, do not alter the Packet Size or TTL settings.** If you are on a low-bandwidth wireless link, we recommend that you keep the “Enable Stuff” feature On. This feature is called stuffing, and will ensure that the Avenir Mini encoder is sending at its full bitrate even if the video currently streaming does not require it. This will help ensure that the video optimization process is based on full-bitrate transmission.

This menu can now store a list of your frequently used decoders, which can include, for example, Streambox Cloud, Streambox Enterprise Server, or a workstation with a Streambox Media Player. Press the “Favorites” button to get a list of Decoders stored on Avenir Mini.



Select a Decoder with the Select button. Edit its settings with the Edit button, and remove it from the list with the Delete button.

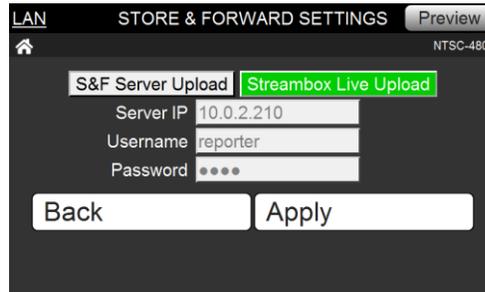
To add a decoder to your list, Press the “Add New” button.



Fill in the fields as if configuring your Decoder on the main Settings page. Press the Save button to return to the list of Decoders.

Press Back to return to the Settings menu without saving changes. Press Apply to save changes and return to the Settings menu.

13.2 Store & Forward Settings

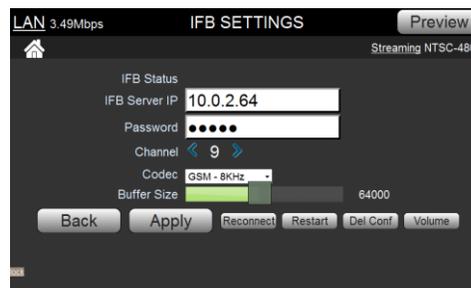


On the Store & Forward Settings screen, set the IP address and reporter credentials (username and password), for transferring file uploads to the Store and Forward Server or Streambox Enterprise Server or, alternatively, the Streambox Cloud Server. Press the “Live Mode” button to upload to the Streambox Cloud Server.

Streambox Decoders with the Store & Forward upgrade can be upgraded with “Store and Forward Receiver” software which will configure a Decoder to receive files directly from Avenir Mini, instead of sending to a server. To send files to a Decoder with Store and Forward Receiver, put the Decoder’s IP address in the “Server IP” field and leave the Username and Password fields blank.

Press Back to return to the Settings menu without saving changes. Press Apply to save changes and return to the Settings menu.

13.3 IFB Settings



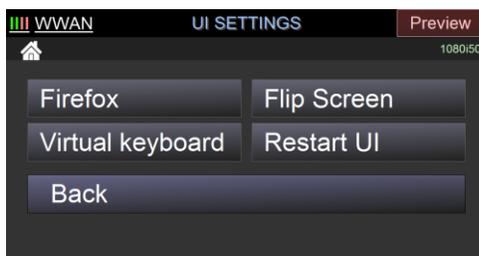
On the IFB Settings screen, set the IP address, password, and channel number or name for the IFB (Interruptible Foldback) Server, in order to receive IFB audio instructions and messages from the receiving location.

Setting the Codec from the available choices will alter the bitrate, and hence audio quality of the audio stream coming from the server. Here the Buffer size can also be adjusted: when set too low, audio will stutter, but increased buffer increases the delay in the audio.

Press Back to return to the Settings menu without saving changes. Press Apply to save changes and return to the Settings menu.

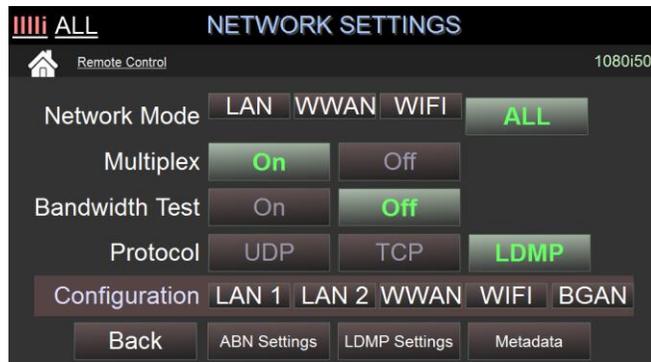
Additional buttons on the Settings menu allow you to attempt to reconnect to the IFB server, restart the IFB Client (within Avenir Mini—this should be used only as a diagnostic step in case of a problem), delete the IFB configuration entirely, and to go to a screen where the receiving volume can be adjusted.

13.4 User Interface Settings



These settings are not applicable in the Avenir Mini.

13.5 Network Settings



On the Network Settings screen, you can configure which network adapter(s) through which you're connecting. The Network mode will always appear in the upper left corner of the screen, and you can tap that word to get to this menu at any time.

- Select LAN (Local Area Network) for when connected via Ethernet cable to a network.
- Select WWAN (Wireless Wide Area Network) when using 3G/4G USB adapters. When you select WWAN, a "Modem Status" button appears. Select this button to view the status and connectivity of connected WWAN adapters.
- Select Wi-Fi (Wireless Area Network, 802.11b/g) when connected to a public or open private wireless network. Remember when using Wi-Fi that the network is controlled by someone else, and that streaming video or large video transfers may not be tolerated.
- Select All to engage multiplexing of multiple connections (LDMP Only)

Multiplex: Select ON to allow a live video stream to be split among more than one WWAN adapter.

Bandwidth Test: Select ON to permit the adjustment of how much bitrate goes through each available WWAN adapter.

Protocol: This setting default to LDMP, the new two-way communication protocol for Streambox Avenir Mini and its Streambox Decoder. However, this will not work in some circumstances, or older versions of Streambox Decoder. If Avenir Mini is unable to communicate with the decoder using LDMP, you can switch to the UDP or TCP. If Avenir Mini is connecting to older versions of Decoder, switch to UDP. (LDMP requires Decoder version 3.128 at least; TCP requires Decoder version 3.125.)

Configuration: See Section 11 for information on configuring the network adapters.

ABN Settings

The ABN button will take you to a screen in which you can manually start and stop a Bandwidth Test, one which normally occurs as part of the Automatic Bandwidth Negotiation.

ABN_TIME (integer) <small>Set ABN duration. Input -- to set default.</small>	45
ABN_AVG (integer) <small>Set ABN averaging interval -- to set default (5 seconds)</small>	19
Max Delay for low latency (integer: ms)	2000
Min bitrate for low latency (integer: kbps)	1500
Max Delay for talking head/action (integer: ms)	2400
Min bitrate for talking head/action (integer: kbps)	500
Max bitrate for ABN/streaming (integer: kbps 500-12000)	3000
EnableSmartStuffing (integer) <small>Set stuffing algorithm for VBR below 0.5s, ON/1- default</small>	--
RTTx for Low Delay	-1
Jitter2 for Low Delay	-1
RTTx for Talking Head/Action	-1
Jitter2 for Talking Head/Action	-1
<input type="button" value="Back"/> <input type="button" value="Apply"/>	

Use the ABN_Time field to adjust the length of the ABN test. It is recommended to run for at least 45 seconds. ABN_Avg is a field that adjusts how sensitive ABN is to changes in bandwidth; it uses this number of seconds to average the measured bandwidth over that time.

The next four fields, “Max Delay for _____” (measured in milliseconds) and “Min Bitrate for _____” (measured in kilobits per second) are the two threshold settings for the respective Smart Presets to which they apply; the first two fields apply to Low Latency only, while the third and fourth field apply to both Talking Head and Action Smart Presets.

When that Smart Preset is selected, ABN uses these measurements as required thresholds for the network connection to meet. The ABN system cycles through groups of LDMP settings, it will use the first one that meets both criteria for streaming.

The field “Max Bitrate for ABN/Streaming” is the maximum bitrate at which Avenir Mini will attempt to stream. This applies to manually-set streams using the Advanced menu as well as Smart Presets.

Enable Smart Stuffing is a feature that regulates the amount of Packet Stuffing added to the stream when the VBR Buffer is set below 0.5 seconds.

The last four fields apply once again to the Smart Presets. These can be specific LDMP settings for the Low Latency and Talking Head/Action Smart Presets. RTTx changes the RTT Multiplier Setting, and Jitter2 changes the Jitter2 buffer setting. The default setting of -1 means that no changes are made from the existing LDMP defaults.

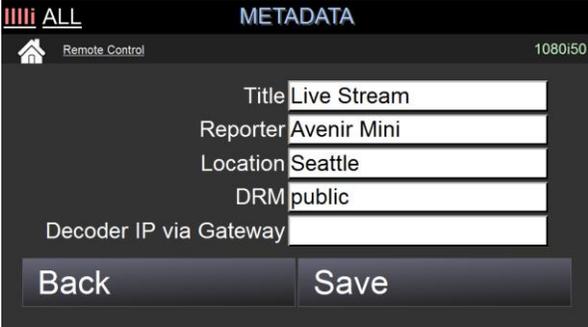
Press Apply to save changes, or Back to leave this screen without saving changes.

LDMP Settings

The LDMP Settings button opens the settings screen for LDMP's settings. Use this screen to enable manual LDMP settings (applies to the Advanced mode only—Smart Presets always use automation for LDMP), adjust the Congestion Window (CWND Minimum and maximum), Acknowledgement Timeout, and Send Timeout settings. See section entitled “Advanced LDMP Settings” for information about these settings.

Press Apply to save changes, or Back to leave this screen without saving changes.

Metadata



The screenshot shows a mobile application interface for setting metadata. At the top, there is a status bar with signal strength, 'ALL', and 'METADATA'. Below that, a home icon, 'Remote Control', and the number '1080I50' are visible. The main content area contains five text input fields: 'Title' with 'Live Stream', 'Reporter' with 'Avenir Mini', 'Location' with 'Seattle', 'DRM' with 'public', and 'Decoder IP via Gateway' which is empty. At the bottom, there are two large buttons: 'Back' on the left and 'Save' on the right.

Metadata allows ACT-L3 live-streams and recorded files to be identified with custom location and usage information. Fill in these fields by tapping on each and using the software keyboard to enter or edit the content. This information is visible to producers and others on the receiving end, so you can inform them as to what you're sending.

When using Avenir Mini in concert with the Streambox Cloud Service, it is required to use these metadata fields. The DRM field must match the “drm” name for your organization (sometimes called “group”). Streambox Cloud will ignore streams with blank metadata, and streams with “public” in the DRM field will be public to all Streambox Cloud users.

Press Save to save changes, or Back to leave this screen without saving changes.

13.6 Advanced LDMP

Overview

LDMP is a streaming video networking transport technology developed by Streambox. LDMP stands for “Low-Delay Multi-path”, and is designed to guarantee fixed latency over multiple network paths as well as aggregate all

available bandwidth for the use of streaming video. LDMP will give more reliable transmissions, and allow combine throughput of multiple network types. LDMP is also a “semi-reliable” transport, which means that users will not need to use as much FEC.

Requirements

- Decoder version 3.139 or later: To update your Decoder software please contact support@streambox.com and arrange for your Decoder to be updated or to get the correct software. Decoder version 3.139 is backwards compatible so if you encounter issues with LDMP you can simply switch the Encoder back to UDP mode.
- UDP Port 1770 open 2-way bi-directionally on firewall: LDMP uses efficient, low-overhead two-way communication over the WAN you use for sending your streams, be it the internet or private network. Units at both ends will receive and send UDP packets through port 1770. Any firewalls between Encoder and Decoder must be configured to allow this two-way traffic and forward the incoming traffic to the Streambox.

Advanced LDMP: Settings

There are three new variables which affect the performance and functionality of LDMP mode, they can be modified by going to “Network -> LDMP”.

- CWND sets the maximum congestion window for all interfaces combined.
- CWND_MIN sets the Minimum congestion window for each individual interface.
- CWND_MAX sets the maximum congestion window for each individual interface.
- ACK_TO is the number of milliseconds the encoder will wait for confirmation that a packet arrived before it tries to resend. This setting affects allowed latency of the stream because interfaces (USB modems for example) that are too slow and don’t meet this requirement will not be used. This is how LDMP is able to guarantee latency. If your total bandwidth seems very low, and cards are not being used then try raising this number.
- SND_TO is the number of milliseconds the encoder allows any interface to exceed the ACK_TO number before it stops using it.
- RTT Multiplier tells the decoder how much predictive jitter buffer to create for out of order packets. Increasing this value will increase reliability and latency when multiple interfaces are used.
- JITTER2 tells the decoder how much predictive Jitter2 buffer to create for bursting or delayed packets. Setting this value higher will increase reliability and latency when network bandwidth fluctuates.

Advanced LDMP: Best Practices

FEC should not be used with LDMP. The nature of LDMP’s interaction between the Decoder and Encoder negates the need for FEC’s redundancy, because the Encoder is better informed as to what the Decoder is failing to receive.

For the best results with rackmount units use the following settings for your respective network.

<p><i>Fast Broadband Public Internet connection single interface</i></p> <ul style="list-style-type: none"> ● CWND: 150 ● CWND_MIN: 5 ● CWND_MAX: 75 ● ACK_TO:200 ● SND_TO:2000 ● RTT Multiplier: 1 ● JITTER2: 10 	<p><i>Slow Broadband Public Internet connection single interface</i></p> <ul style="list-style-type: none"> ● CWND: 150 ● CWND_MIN: 5 ● CWND_MAX: 75 ● ACK_TO:300 ● SND_TO:2000 ● RTT Multiplier: 1 ● JITTER2: 10
<p><i>Broadband Public Internet connection multiple interface</i></p> <ul style="list-style-type: none"> ● CWND: 150 ● CWND_MIN: 5 ● CWND_MAX: 75 ● ACK_TO:300 ● SND_TO:2000 ● RTT Multiplier: 1 ● JITTER2: 30 	<p><i>LAN connection single interface</i></p> <ul style="list-style-type: none"> ● CWND: 150 ● CWND_MIN: 5 ● CWND_MAX: 75 ● ACK_TO:150 ● SND_TO:2000 ● RTT Multiplier: 1 ● JITTER2: 10
<p><i>BGAN or Thuraya Broadband Satellite</i></p> <ul style="list-style-type: none"> ● CWND: 75 ● CWND_MIN: 75 ● CWND_MAX: 75 ● ACK_TO:1200 ● SND_TO:2000 ● RTT Multiplier: 0 ● JITTER2: 0 	<p><i>WWAN with Slow or Unreliable Networks</i></p> <ul style="list-style-type: none"> ● CWND: 170 ● CWND_MIN: 25 ● CWND_MAX: 25 ● ACK_TO:1200 ● SND_TO:2000 ● RTT Multiplier: 4 ● JITTER2: 400
<p><i>WWAN with LTE Networks</i></p> <ul style="list-style-type: none"> ● CWND: 150 ● CWND_MIN: 5 ● CWND_MAX: 75 ● ACK_TO:250 ● SND_TO:2000 ● RTT Multiplier: 1 ● JITTER2: 40 	<p><i>WWAN with 3G Networks</i></p> <ul style="list-style-type: none"> ● CWND: 75 ● CWND_MIN: 5 ● CWND_MAX: 75 ● ACK_TO:300 ● SND_TO:2000 ● RTT Multiplier: 1 ● JITTER2: 40

13.7 System Settings

Restart Encoder/Restart Avenir Mini

The System Screen can be used to restart the Encoder Software with the “Restart Encoder” button, or restart the entire Operating System by pressing the “Restart Avenir Mini” button.

Restore Defaults

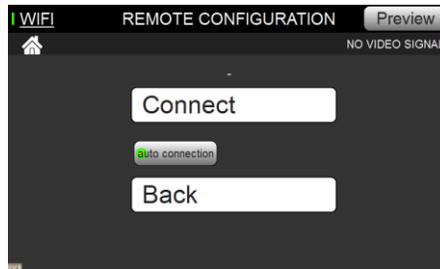
The Restore Defaults button will restore all settings to their initial state. This will delete decoder and server settings, video input settings, etc. Be careful when using this button!

Remote Configuration

Remote configuration is a very simple way for you to connect your Avenir Mini to the network—no matter which network type is available—and connect to a Streambox Technician who can examine the menus and settings, and often replicate your issue right there in your own machine. Streambox technicians also have access to hidden settings that can aid your streams and Aircard usage as well. Remote Configuration is automatically enabled

To begin a Remote configuration session with a technician, studio engineer, or Streambox Support, begin by connecting Avenir Mini to a network. Next, call the tech, engineer, or calling Streambox Support. When the technician is ready to work with your Avenir Mini, be ready to tell them the Avenir Mini's Serial number.

Technicians and Engineers should see “Section 14: Remote Configuration Over the Internet” to see how to remotely connect to Avenir Mini.



The Avenir Mini will connect to a Streambox server using SSH, a secure communications link, using a high-numbered port to ensure the connection doesn't interfere with other network traffic. The Streambox technician will verify your connection, and then connect via the Streambox server to your Avenir Mini.

You may not see the screen or menus change, because the technician will see his own set of menus and settings.

Remote configuration works over LAN and Wi-Fi and even works over 3G/4G connections.

NOTE: When using Remote Configuration and streaming through the same connection, make sure to limit your streaming bitrate so the Remote Connection has sufficient bandwidth to continue operating.

File Sharing

The File Sharing button can stop and start the File Import feature. Please see “Section 15: File Import” for an explanation and instructions for that feature.

Update Software

Avenir Mini can update its software over the internet. You must have a network connection capable of accessing the web, but any connection will do. From time to time, you may receive an email from Streambox asking you to apply a new update.

Press the Update Software button on the System Settings screen. You'll first be shown a warning overlay, reminding you to stop any stream and make sure the Streambox is connected to a reliable, preferable wired, internet connection. Press "Update" to continue to the update screen:



On this screen you can see various software releases for Avenir Mini. Some of them are explicitly labeled BETA, which means that they are unsupported experimental software being tested by willing customers. Speak with a Streambox support representative to find out whether one of the Beta software releases has a new function that you'd like to help test.

Find the software version you'd like to change to, and select "Upgrade" or "Downgrade" as the case may be. One does not need to upgrade to each incremental version—there is no harm in skipping a version and upgrading directly to the newest software.

Depending on your network connection's available bandwidth, the upgrade can take several minutes to download and then several more minutes to install the updates. If the update process is interrupted, just try again. Updates are free for the foreseeable future.

Following an upgrade or downgrade, the Avenir Mini will require a restart in order to apply the changes. You can perform a soft restart in the system menu or you can manually reboot the entire unit.

APN Name

This button allows one to change the name of the Wi-Fi access point, known as the SSID, of Avenir Mini. Normally, Avenir Mini's SSID is the same as its serial number.

Do not make this SSID the same as your regular Wi-Fi network. This network is one created by Avenir Mini alone. Do not attempt to use Avenir Mini as an ordinary Wi-Fi access-point.

Restart UI

This button will restart and refresh Avenir Mini's User Interface. Use this when asked to by a Support Technician.

14 Network Configuration

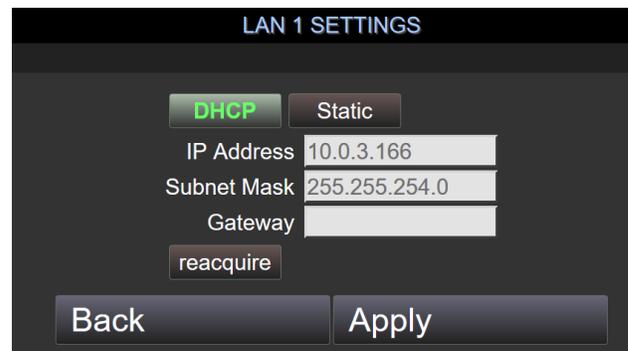
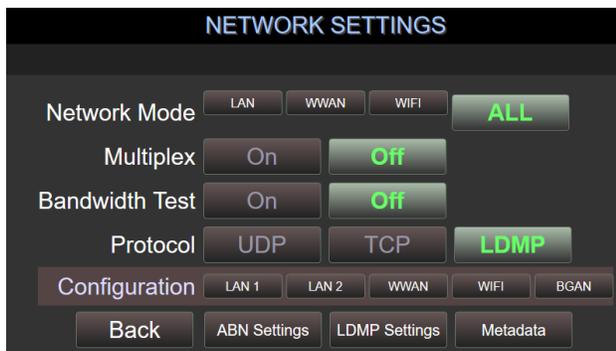
For each Streambox unit to function properly over an IP connection it will need an IP Address, Subnet Mask, and Gateway. The TCP/IP settings should be provided by the network administrator or Internet Service Provider.

From the Home Menu; select Settings, then select Network. Select the type of network you're connecting to. When using WWAN or public Wi-Fi, an IP address will be assigned automatically through DHCP (in which a server on the network provides an address), and manual configuration is unnecessary. However, LAN connections and sometimes private Wi-Fi connections will require manual setup.

As of version Avenir Mini 1.8.0, an "ALL" button has been added to permit the use of multiple types of connections at once; selecting the All button will permit you to access the configuration menus for LAN1, LAN2, Wi-Fi and WWAN all together. Disconnect any connections that are not to be used for streaming.

14.1 LAN Configuration

Select LAN from the list of network types. Avenir Mini has two LAN adapters, so select from LAN1 and LAN2 to choose which adapter you'll be configuring.



Use the available fields to adjust IP address, Subnet Mask, and Default Gateway, as well as to switch from DHCP to Static IP.

14.2 Wi-Fi Configuration

Select WI-FI from the list of network types. Then select "Wi-Fi" to connect to a network.

Select WPA (1 or 2 Personal are supported, but not WPA 2 Business), WEP, or None for the level of encryption required by the available network. If you know the SSID (Network name, a.k.a. Access Point name) for the Wi-Fi network you'd like to



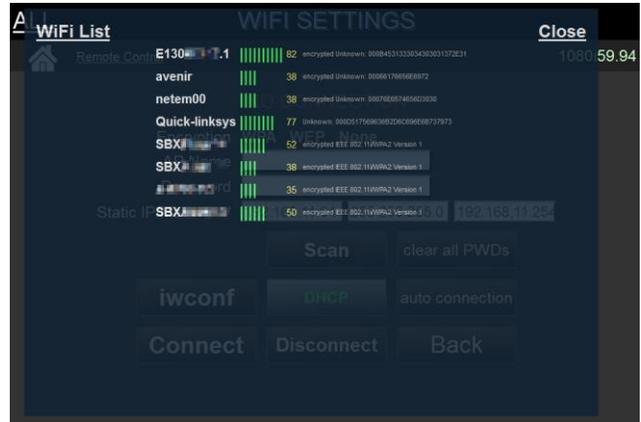
connect to, you may enter it on the “AP Name” line, which is not case-sensitive. Then enter the caps-sensitive password in the Password field. Press Connect to join the network. If required, the IP Address, Subnet Mask, and Default Gateway can be entered manually. At any time, press Disconnect to abort the connection or to leave the network.

If you don't know what networks are available, Press the “Scan” button to detect nearby networks. A screen overlay will appear and, after a moment, begin to list available networks and a number of bars indicating signal strength (more is better). Select a network from the list by tapping on the name. Enter Encryption Level, password if necessary, and press Connect.

Note that not all Access Points will transmit their Name/SSID, as a security measure. If your network is not listed, try manually entering the AP Name. Consult a system administrator if you do not know what that should be.

WWAN: See Section 12 for information on WWAN settings

BGAN: Used for configuring the Hughes BGAN Terminal for the satellite internet connection.



14.3 WWAN (Wireless Wide Area Networking)

WWAN refers to the regional data networks established by mobile telephone carriers.

Emphasizing maximum area of coverage over quality, the WWAN network extends in some form over nearly all of the United States and North America, and the areas of high population on every continent.

In every case, the WWAN network (or networks) is supported by a cellular infrastructure, wherein the coverage area is divided into circular regions, cells, and at the center of that cell is the transmitter/receiver. As with cellular telephone calls, WWAN connections are handed off to different fixed antennas as the user moves from cell to cell. Cells in densely populated areas are equipped to handle more calls and data connections than cells in sparsely populated areas.

At the edge of the coverage, in remote areas, the network might only cover a highway or a small population center. Mountains and large bodies of water are often obstacles in receiving a signal to connect to WWAN networks. In regions supported by multiple carriers, there will be areas that are covered by one carrier that isn't covered by some others.

WWAN and Cellular/Mobile telephone carriers use numerous radio technologies to carry the WWAN network and mobile phone communications. Devices capable of connecting to some of these technologies are not able to

connect to all of them. The technologies primarily differ in the specific radio frequencies they use, and how the device will obtain access to the network.

CDMA ([Code Division Multiple Access](#)) and GSM (Global System for Mobile Communications) are the two most common standards for mobile telephone communications; a device capable of using one standard will be incompatible with the other. Each mobile carrier will establish a network using one or the other standard, and sell only devices compatible with that standard. In the United States, for example, AT&T and T-Mobile use the GSM standard, while Verizon Wireless and Sprint use CDMA. In most of Europe, GSM is the only standard. CDMA networks cover Japan, excluding GSM entirely. If you are uncertain whether your device is GSM or CDMA, note that all GSM devices carry a SIM card to uniquely identify the unit. CDMA devices do not carry SIM cards.

Within each of those standards, there are radio technologies that are constantly being improved for speed, security, enhanced connectivity, and so on. These technologies include PCS, PDC, IS-95, iDEN (2G), GPRS, EDGE (2.5G), UMTS, HSDPA (3G), WiMAX, LTE, HSDPA+ (4G) and many others. The “G” ratings by which they are grouped signify the generation of technology to which they are attributed, though numerous enhancements to each technology mean that the enhanced versions can span the generations. (The first generation, 1G, was basic analog cellular telephony.) Though some of these technologies are outdated, the older generations still exist at the fringes of the network, as it takes time and money to convert an antenna tower from 2.5G to 3G to 4G. As a result, many mobile communications devices will support several generations at once.

In practice, devices that connect to these WWAN networks fall into two categories: stand-alone, and computer modem. Stand-alone devices include mobile phones and smartphones, and wireless “hotspots” that permit Wi-Fi connections and connect them to the internet via 3G or 4G. The Computer modems are generally connected to a computer via USB and require the computer to run specific software in order to “dial” the modem and connect to the WWAN network. The Avenir Mini uses the modems, but contains its own software for connecting the modem to the internet.

Connecting Avenir Mini to WWAN

The Avenir Mini contains 4 embedded modems, selected at the time of manufacture, for connecting to 3G or 4G WWAN data networks. A plate on the Avenir Mini chassis conceals the ports for adding SIM cards to the modems. CDMA modems are also supported and do not require SIMs.

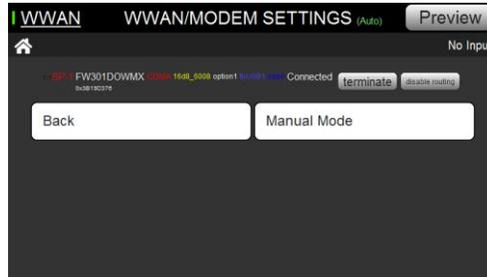
Additionally, 2 USB (2.0) ports on the side of Avenir permit the user to attach additional USB WWAN adapters for additional network connectivity.

NOTE: USB modems must be initialized before use with Avenir, and occasionally updated over time, using a Windows or OSX computer. Streambox recommends that USB modems be checked on a regular computer every few months.

Some USB WWAN adapters require that they be connected at a right-angle to their general oblong shape—in those cases, use a short USB extension cable (often provided with the WWAN adapter, or available from the

WWAN carrier, or wherever cables are sold) to connect the adapter to the Avenir Mini, again using the recessed compartment. If that is not available, you may still connect the WWAN adapter directly to the side-panel.

Once connected, the Avenir Mini should automatically detect the WWAN adapters – it may take several minutes. When some or all WWAN adapters are connected and you wish to connect the Encoder to the WWAN networks, go to the Network Settings screen (Home -> Settings -> Network) and select WWAN from the Network mode choices. You will see the “WWAN/Modem Settings” button become available. Select that to view information about individual WWAN adapters.



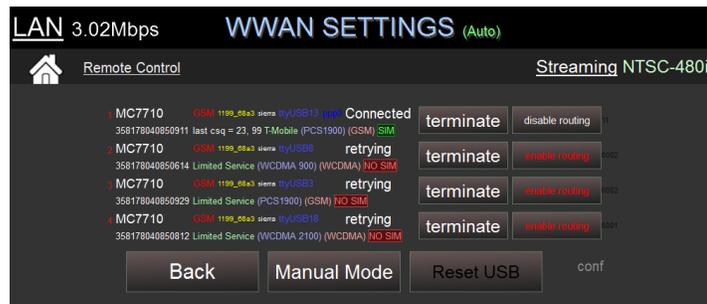
Once connected, WWAN adapters will assign themselves an IP address, issued by the carrier. For that reason, there are no manual IP settings for WWAN connections.

WWAN Settings (Modem Connection Manager, MCM)

Before using a new USB WWAN modem with Avenir Mini, the modem has to be activated and initialized first on an ordinary USB-equipped computer (Mac OSX or Windows) using the modem carrier’s software, which is provided with the modem or can be downloaded from the carrier’s website.

WWAN modem operation is similar to the operation of a dial-up modem. Modem Connection Manager (MCM) needs to establish a dial-up connection first and then it tries to establish a data connection.

The first time Avenir Mini uses a particular model of WWAN modem, the modem must be configured in Manual mode to connect to the carrier’s network. Following that, the modem may be used in automatic mode. The current mode is indicated in parenthesis to the right of the Modem Settings heading.



Automatic (Auto) mode

This is the default mode, for use with modems already configured by the user or by Streambox. When in Automatic mode, a modem is plugged in to Avenir Mini, and the MCM automatically attempts to connect to the Internet. After connecting successfully, the MCM will enable the routing of data from the encoder to stream to the Internet.

When in Automatic mode, two buttons appear next to each modem's entry: Terminate, which will sever the connection to the Internet, and Enable Routing, which forces the MCM to route data from the encoder to the connection.

NOTE: Normally it is unnecessary to press either of these buttons.

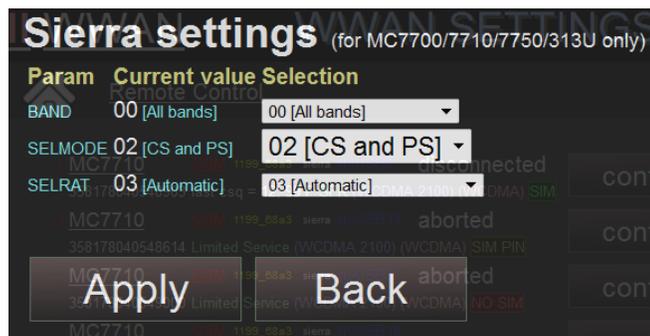
Manual mode

Switch to Manual mode whenever using a modem for the first time in Avenir Mini and the modem is not recognized.

You can configure a modem by clicking the "Config" button. If the modem is connected, click the "Terminate" button to disconnect so the Config screen can be accessed. After the modem is configured and saved, users can connect to the Internet manually by clicking "Reconnect" button.

In the Config screen, enter appropriate settings information (usually the APN is all that is required, but sometimes the username, password, SIM PIN, and/or telephone number) in the modem configuration screen, and click "Save" button.

While the modem is disconnected, some information can be accessed on the modem by clicking the modem model name (e.g. MC7710); if that modem is underlined, the link is available. A display of the modem's band settings, SIM detection, and more is shown. Additionally, if the modem is a Sierra modem on GSM networks, the word GSM, appearing in red, can be clicked while the modem is disconnected, and the Sierra Settings screen is displayed:



On this screen, the Band selection, the Service Domain selection (SELMODE), and the Radio Access Technology setting (SELRAT). These settings are usually changed by Streambox Engineers at the time of initial setup for the SIM.

NOTE: If all modems are already configured and are able to use Automatic mode, do not use the Manual mode to change connection settings.

Polling Mode

This is a modem-diagnostic mode that will not connect the modems to the network, but will interrogate the modems' connections and attempt to measure them.

Modem Configuration Settings

The screenshot shows a 'MODEM CONFIGURATION' screen with a dark background. At the top left, there is a logo with three vertical bars and the text 'ALL'. Below it is a home icon and 'Remote Control'. The top right shows '1080i50'. The screen is divided into three main sections: 'Modem Information', 'Modem/PPP Configs', and 'Initialization AT cmds'.
1. 'Modem Information' (left):
- USB ID: 1199_68a3
- Name: MC7700
- Maker: Sierra Wireless, Incorporated
- Rev.: SW9200X_03 05:20 03ap
- r5600 carmd-en-10527.2012/11/18 12:06:50
- S/N: 012620001294295
- TTYs: ttyUSB15, ttyUSB16, ttyUSB17, ttyUSB18, ttyUSB19
- Signal Info (link)
2. 'Modem/PPP Configs' (middle):
- SIM PIN: [text input]
- APN: [text input]
- Phone No.: [text input]
- UserID: [text input]
- Passwd: [text input] PAP [dropdown]
- Metric: 300 [text input]
- carrier type: Auto [dropdown]
- Apply to: This S/N [dropdown]
- DirectP: Off [dropdown]
3. 'Initialization AT cmds' (right):
- AT cmd 1: [text input]
- AT cmd 2: [text input]
- AT cmd 3: [text input]
- AT cmd 4: [text input]
- AT cmd 5: [text input]
- AT cmd 6: [text input]
- AT port: Auto [dropdown]
- PPP port: Auto [dropdown]
At the bottom are three buttons: 'Save', 'Back', and 'Help'.

Modem Information

On the left side of this screen is a display of this modem information, which includes its model and maker, serial number, and a list of serial ports called TTYs. If possible, this will note which USB port, "Slot" in which it is plugged.

SIM PIN

This is the Personal Identification Number inside the SIM card. It's a security passcode unique to each modem. Only GSM modems require it.

APN (Access Point Name)

This is the network component belonging to the carrier that resides on the internet and connects to the modems. Often the carrier's configuration software has already set the appropriate APN in the modem (or stored on the SIM card), so users don't have to specify it. If it is not the case, users can specify the APN of the carrier.

CDMA modems don't require an APN.

Phone number

1. CDMA modems:
"#777" is the default phone number. You can leave the phone number blank and MCM will automatically use this number.
2. GSM modems:

“*99#” is the default phone number. You can leave the phone number blank and MCM will automatically use this number. If the modem has multiple configuration profiles, each of which has an APN setting, the phone number is used to specify the profile. For example, the phone number for profile 2 is “*99**2#” while the phone number for profile 3 is “*99**3#” and so on.

User ID and Password

This is used for establishing a PPP (Point-to-Point Protocol) connection. Most carriers use common user ID and password for all users/modems. Some operators like T-Mobile don't need them.

Metric

This field is an experimental field used to prioritize any connection for purposes of the Remote Config connection. This has no effect on the Streaming processes. Metric defaults at 300 for WWAN modems, 200 for Wi-Fi, and 100 for LAN. (The Wi-Fi and LAN settings are hidden.) The lower the Metric number, the higher the priority.

Carrier Type

The communications technology used by the modem's carrier: either GSM or CDMA. Most of the time, auto detection will detect the carrier type. If not, ask your carrier which one to select.

Apply to

Use this menu to specify to which USB port (referred here as “USB Slots”) on Avenir Mini the configuration is applied. The choices here are “This S/N” (This Slot Number), the current slot in which the modem is plugged. “Any,” which refers to any of the 8 slots, “SP Slot 1” (Special Slot #1), which is the leftmost top USB port as face the screen while orienting the battery shoe downwards. “SP Slot 2” (Special Slot #2), which is the USB port adjacent to Special Slot #1.

AT Commands

Use these fields to specify AT (a.k.a. Hayes) modem commands to initialize the modem. One typical case is “ATZ”, which means “modem reset.” Commands must have the AT (“Attention”) prefix before the command. Lists of AT or Hayes commands can be found on the Internet.

Serial Port

Most modems have multiple ports and sometimes the MCM cannot find which one is the correct modem port. In that case, users must specify the correct port manually. In the “Modem Information” in the left side of the screen, the line labeled “TTYs” shows the detected ports of the modem.

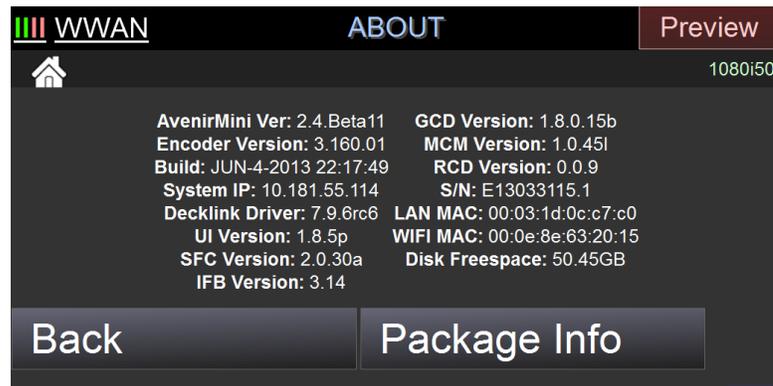
14.4 BGAN (Satellite)

BGAN connections have higher latency range from should be 256Kbps or higher. The Streambox Avenir has some configuration options that allow it to connect directly to the BGAN terminal. To connect and use BGAN on the Avenir use the follow steps.

1. Set the Avenir to the ALL Network mode.

2. Connect the Avenir to the HNS9201 terminal with an Ethernet cable. Be sure the terminal is powered on, then power on or restart the Avenir unit
3. From the Avenir full user interface select Settings > System > HNS9201
4. Select Term IP and verify that the IP is the correct IP for the HNS9201 terminal (192.168.128.100)
5. Select Open Term, the unit should display the terminal information and prompt for registration.
6. Select the desired connection and the terminal will start the connection. If registration or connection fails then you may need to use a laptop to connect to the terminal and establish a connection using BGAN Launchpad.
7. After the connection is created you need to use a custom preset to stream live with BGAN optimal settings. While video source is connected select Presets > BGAN-Streaming 256K or an appropriate preset for your connection and choose "CustomP". This will set the custom preset button on your home screen to the selected preset for easy access. For streaming live video with BGAN, minimum 256K Streaming class connection is recommended.

15 About Menu



The About screen displays the version and build information about the software and web server running on the Avenir Mini unit, as well as numbers that are unique to this Avenir Mini, such as its MAC address (network hardware address) and its Streambox Serial Number (S/N). This information may be requested by a Streambox support technician.

This screen also displays the current IP address of the machine if connected to a network. (The IP Address displayed is that of the LAN1 port before the LAN2 port, or the IP of the first WWAN adapter plugged in, or else the Wi-Fi adapter's IP address.)

Finally, this screen displays the amount of available file-storage space on the solid-state drive used for storage. If this amount gets below 1 GB (Gigabyte), it is time to delete some files to recover space.

The Package Info button will display another screen with additional version information. A Streambox Technician may ask the user to obtain information from this screen during troubleshooting or an upgrade.


PACKAGE INFO
Preview

1080i50

<p>avenir-logrotate-conf 0.2 <small>logrotate config files for encoder and micr</small></p> <p>avenir-updater 0.1.5 <small>Avenir Remote Software Update Daemon</small></p> <p>avenirifd 1.8.0.15b <small>Network Interface configuration Daemon for Avenir</small></p> <p>config4root 1.0.11 <small>root account configuration for starting</small></p> <p>gpiomonitoranddriver 1.28 <small>GPIO Monitor & driver for Winbond W83C87DHW</small></p> <p>madwifi-config 1.0.3 <small>configuration for WiFi Master mode of ath_pci dev</small></p> <p>modemconnectionmanager 1.0.45l <small>modem connection manager</small></p> <p>relocal4avenir 1.0.2 <small>libcrti local file for Avenir</small></p>	<p>0.2</p> <p>0.1.5</p> <p>1.8.0.15b</p> <p>1.0.11</p> <p>1.28</p> <p>1.0.3</p> <p>1.0.45l</p> <p>1.0.2</p>	<p>restorekit 0.0.2 <small>restore the default setting files (Avenir)</small></p> <p>serial-touchscreen 1.0.0 <small>touchscreen serial configuration for Xorg</small></p> <p>sfc-for-avenir 2.0.30a <small>SFC Client for Avenir</small></p> <p>sierra-driver 1.7.40 <small>Sierra wireless modem driver for 2.6.34</small></p> <p>streambox-encoder-for-avenir 3.160.01 <small>Streambox Encoder for Avenir</small></p> <p>streambox-ibfclient 3.14 <small>Streambox FB Client</small></p> <p>wireless-drivers 2.6.34sb2.4.1 <small>updated wireless drivers for kernel 2.6.34sb2</small></p> <p>www-for-avenir 1.8.5p <small>Web files (HTML, PHP, CSS) for Avenir</small></p>	<p>0.0.2</p> <p>1.0.0</p> <p>2.0.30a</p> <p>1.7.40</p> <p>3.160.01</p> <p>3.14</p> <p>2.6.34sb2.4.1</p> <p>1.8.5p</p>
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Back
reload

ock

16 File Import

File Import is a feature in which you can now set Avenir Mini on a network, enable this feature, and then you can move files (such as recorded ACT-L3 files) to and from the Avenir Mini. Perhaps you want to send in a file you created outside Avenir Mini, using our Store and Forward client, or extract a file from Avenir Mini so you can put it into a laptop editor. Either way, File Import will let you move files as easily as using a shared network drive.

Note that this File Import system will work with Streambox and non-Streambox systems (that support CIFS/SMB for file transfer) alike. If sending files to a Streambox system, it is better to use Avenir Mini's Store and Forward Client, but this system will let you share files from or to a non-Streambox Windows or OSX system with ease.

16.1 Enabling File Import

Begin by putting Avenir Mini on a network over which it will be sharing files. Connect Avenir Mini to an private LAN if available, or create a small LAN by connecting an Ethernet cable from Avenir Mini to the workstation or notebook computer with which it will share files. Alternately, you can connect to Avenir Mini's own Wi-Fi network.

Activate this feature by starting at the Home screen and selecting Settings -> System -> Others -> CIFS/SMB and press Start. The word "ON" will appear when this feature is started.

16.2 Connecting to Avenir Mini

Any OSX, Windows, or Linux computer can connect to Avenir Mini as if Avenir Mini is a Windows (CIFS) network drive. The connecting computer does not have to be a Streambox or running Streambox software to connect. Use that computer to connect to Avenir Mini as a guest and Avenir Mini will share a network-shared folder called "actl3". Opening this folder will reveal the RAW ACT-L3 video files recorded by Avenir Mini, often with an xml-file of the same name, which contains the metadata.

The connecting PC has read/write permission to this folder: its user can take files off, or put files on Avenir Mini in this fashion. Once on Avenir Mini, any files can be sent to the Store & Forward Server using the built-in Store & Forward client.

Connecting over LAN

To connect to Avenir Mini over LAN using a Mac, Open Finder, open the "Go" menu and select "connect to server..." (or just Command-K) and, using the address for Avenir Mini's LAN connection (as seen in its Network settings), enter the server address as

smb://IP Address

Example: smb://10.3.10.50

If prompted for a login, select guest access or use guest as the username, no password.

From a Windows PC, use Start -> Run and enter

\\IP address

Example: [\\10.3.10.50](http://10.3.10.50)

If prompted for a login, select guest access or use guest as the username, no password.

Connecting with Wi-Fi

To connect to Avenir Mini over Wi-Fi, one uses the same Wi-Fi connection used by the remote-control via iPad/iPod/iPhone (see Section 16). Connect to an Access Point with the Avenir Mini's serial number as the network name. The password is "1111111111" (that's ten ones). This gives access to Avenir Mini's private Wi-Fi network, but doesn't grant access to the files.

NOTE: You must use Avenir Mini's Private network for this function; to attempt this using a Public Wi-Fi connection will could expose your files to tampering or deletion.

To access Avenir Mini's file-store, connect to Avenir Mini's Wi-Fi address on its own network: 10.111.111.1
To connect to Avenir Mini over Wi-Fi using a Mac, Open Finder, open the "Go" menu and select "connect to server..." (or just Command-K) and enter the server address as
smb://10.111.111.1

If prompted for a login, select guest access or use guest as the username, no password.

From a Windows PC, use Start -> Run and enter
\\10.111.111.1

If prompted for a login, select guest access or use guest as the username, no password.

File Import and WWAN

As with using a public Wi-Fi, using WWAN with File Import would amount to sharing your files over the public Internet. Additionally, WWAN modems are not all alike and some may not handle the sharing correctly. For these reasons, Streambox strongly recommends you **never** use File Import while connected to WWAN.

Appendix A: Avenir Mini 4 Specifications

Video Formats	HD: 1080/23.98PsF, 1080p/23.98, 1080p/24, 1080p/25, 1080i/59.94, 1080i/50, 720p/59.94, 720p/50; SD: (NTSC): 525i/59.94, (PAL): 576i/50
Video Encoding	HD: 1920, 1440, 1280, 960x1080, 1280, 960, 800, 640x720, 1920x540; SD: 720, 528, 480, 352x480, 320x240, 720, 528, 480, 352x576, 320x288, 720x240, 720x288
Audio Formats	AAC, CELP, GSM 1/2/4/8 channels
Compression	Streambox ACT-L3 Advanced Profile
Network Interfaces	Up to 5x embedded 3G/4G/LTE modems and 5x external USB modems, 1x Gigabit Ethernet, 2x Wi-Fi (802.11 a/b/g/n)
Antennas/RF	High gain antenna array for 3G/4G/LTE, Dual-Wi-Fi Antenna
Video In	HD-SDI and HDMI-full size
Audio In	Embedded SDI Audio, HDMI audio
Video Post-Filtering	Interlaced/progressive post filtering, including de-blocking, de-mosquito, and anti-aliasing
Metadata	End-user selectable: Title, Reporter, Location, Group
IFB Audio Support	3.5mm stereo
Color Profile	4:2:0, 4:2:2
Forward Error Correction	Reed-Solomon, Parity, Shuffle; adjustable from 0 to 50%
Store & Forward	Supports S&F Server, Live Server, Enterprise Server or Decoder SFR
User Interface	Touch screen 2.4" LCD or remote via Web, iPhone, iPad or Android
Storage	64 GB SSD
Operation	Automatic and Advanced; One Click Automation Modes: Low Delay, Talking Head and Reliable
Latency	User selectable, sub second, 2 seconds, up to 14 seconds
Network Protocol	LDMP 2.0, UDP, TCP
Dimensions	5.5"W x 7.9"D x 2.3"H (14cm W x 20cm D x 6cm H)
Weight	3.6lbs (1.6kg)
Battery Life	1-2 hrs (depending on battery type)
Power	AC 100-240V 50/60Hz, DC 11-17V, Max. 65W
Accessories	AC Adapter
Options	Streambox Signal Extender (SSE) 1.6, SSE 4 USB, SSE 10 USB, SSE2.0

Appendix B: Functional Test

It is recommended to perform a functional test of your Streambox system to both verify functionality and to familiarize yourself with the configuration and usage. The systems should be set up back-to-back in a controlled environment with inputs and outputs connected similar to how they would be set up in the production environment.

Ethernet Bench Test

To bench test an Ethernet system you will need an Ethernet (CAT5) crossover cable. This is different from a T1/E1 crossover cable. A standard category 5/6 (CAT5) crossover cable with RJ45 connectors can be used. Alternatively, an Ethernet hub or switch may be used for bench testing.

Connect the Streambox Units

Make all required video, audio, and network connections for testing at this time. After the Streambox units are installed and connected, power them on and verify operation.

Enter IP Address Information

After the units have powered on, enter a private static IP address for each system to test with. You may use the following IP address information in most cases.

Encoder

IP Address: 10.0.2.130

Subnet Mask: 255.255.255.0

Gateway: Not required for this test

Decoder

IP Address: 10.0.2.131

Subnet Mask: 255.255.255.0

Gateway: Not required for this test

Set Test Parameters

After network connectivity has been established the ACT-L3™ Transport must be configured.

1. Start by entering the target decoder IP address (10.0.2.131 in this example) on the encoder and setting a target bitrate.
2. On the decoder, verify that a data stream is being received by examining the front panel display.
3. Next, verify the video and audio output from the decoder's baseband outputs.

Test the System

Experiment with different settings to familiarize yourself with the ACT-L3™ Transport.

Appendix C: Recommended Batteries

Streambox uses and recommends IDX Batteries and chargers with the V-Mount connector, for Avenir Mini. Recommended batteries include E-10, E10S, E-HL9, and E-HL9S. Additionally, a pair of model E-7 batteries joined in Tandem will be adequate.

NOTE: Neither the IDX VL-2PLUS Charger nor a single IDX E-7 battery can supply Avenir Mini with adequate power for full HD encoding.

Streambox can also be used with Anton-Bauer batteries either by the Gold Mount connector (optional) or by using an adapter (Anton-Bauer model QR-A200) to convert the IDX V-Mount to the Anton-Bauer Gold Mount.

The Anton-Bauer batteries that are approved for use with Avenir Mini are DIONIC 160, DIONIC HC, DIONIC HCX, HYTRON 100, HYTRON 140, and the DIONIC 90.

NOTE: The DIONIC 90 cannot continuously supply enough power for full HD encoding.

Appendix D: Troubleshooting/FAQ

WWAN Modems/SIMs are not connecting:

1. Go to Network Settings: *Home -> Settings -> Network*
2. Select WWAN, and select WWAN Configuration.
3. For the modems that are not connecting, select Reset. When the modem is reset, it will disappear, and then re-appear with the Config button. Click Config.
4. Enter the APN, Username, Password, SIM PIN, and so on. (Many of these fields are supposed to be blank.) This information can be obtained from the SIM carrier.

“NO VIDEO SOURCE” appears in the upper right of the screen:

1. Reboot Avenir.
2. Check that the camera is connected, powered, and set to output a compatible video format. (See manual for formats.)
3. Check and replace cable.

Video Stream not received:

This usually indicates the Decoder is unreachable. Start a stream with a Smart Preset; if Bitrate shows 0, Latency shows 0.0 for the duration of the test, the Decoder cannot be reached.

7. Check Decoder Settings and confirm the correct Decoder selection, IP address and port number.
8. If available, try streaming to another Decoder
9. Check internet connectivity from Avenir by attempting to connect through the Remote Config Server (see Section 2.1 **Online Remote Configuration**)

Operating in very poor 3G connectivity areas:

Home -> Advanced

Set the following values.

Bitrate: 2Mbps

VBR: 5sec

FEC: 5%~10% (or more if needed)

Resolution: SD Single Field

Or select an appropriate preset from *Home -> Preset*

BGAN BGAN 220k	3G 3G Low Delay 3s 700K
-------------------	----------------------------

BGAN-Streaming 256K X-BGAN340K	3G Reliable 1.5mbps 3G Driving 1.1m 7s 3G Talking Head 1.2Mbps 4s
<u>LAN</u> LAN 3Mbps reliable 7s LAN – 6Mbps	<u>3G/4G</u> Bonded – 1Mbps Bonded – 2Mbps Driving 2.5m 4s Talking head 3Mbps 2.5s Reliable 3mbps

Stream bandwidth drops by 30% or more:

1. Home -> Advanced
2. Set the Bitrate at around 50% of dropped bitrate

Example: If with 3Mbps ABN selected and 30% drop (around 2Mbps) will freeze the video. Go to Home -> Advanced, and set the bitrate to 1.5Mbps (50% of 3Mbps)

Recommended ABN Setting:

Home -> Settings -> Network -> ABN Settings

Max bitrate for ABN/streaming: (sets a ceiling for stream bitrate)

- 3G areas - 2000 kbps
- 4G/3G - 3000 kbps
- Wi-Fi - 3000
- LAN - 8000 kbps

Appendix E: Contact Information

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+1 206.956.0570 Fax

Technical Support

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+1 206.956.0544, Option 2

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