

LiveU LU600

User Guide



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About This Guide

This user guide describes the LiveU LU600 live video uplink system and provides basic information for the operation of the unit in the field.

NOTES

Advanced operations intended for technical personnel and system administrators are outside of the scope of this user guide.

The guide contains the following chapters:

- **Chapter 1, Introducing the LU600**, page 12, introduces the LU600 Live Video Uplink unit and describes its hardware components.
- **Chapter 2, Quick Start**, page 18, describes how to quickly get started using the LU600, and describes the *Home* screen and its options.
- **Chapter 3, Using the LU600**, page 22, describes the functionality of the LU600 and its operation.
- **Chapter 4, Advanced Configuration Settings**, page 46, describes how to configure advanced configuration settings on the LU600.
- **Chapter 5, Store and Forward**, page 50, describes Store & Forward mode, and its operation on the LU600.
- **Chapter 6, File Transfer (FTP)**, page 58, describes how to use the LU600 to transfer files from the field directly back to the back office / studio.
- **Chapter 7, Interrupted Feedback (IFB)**, page 63, describes the LU600's IFB feature and how to set it up. IFB provides a unidirectional audio channel from the studio to LU600 unit operators in the field.
- **Chapter 8, Video Return**, page 67, describes Video Return functionality and how to use it on the LU600.
- **Chapter 9, DataBridge Operation**, page 67, describes LiveU's DataBridge solution and how to operate the LU600 unit as a portable high-speed broadband router.
- **Chapter 10, Working with Metadata on the LU600**, page 74, describes how to work with the metadata functionality included in the LU600.
- **Chapter 11, Using the Wired Remote Control**, page 77, describes how to use the wired remote control provided with the LU600 backpack.
- **Chapter 12, Handling the LU600**, page 81, describes how to perform various hardware-related tasks for handling the LU600, such as replacing the battery, inserting standard and Dual-SIM cards and so on.
- **Chapter 13, FAQs**, page 94, answers various frequently asked questions about the LU600.

- **Appendix A, Safety and Maintenance**, page 98, describes how to maintain the LU600 unit and how to handle potential hazards.
- **Appendix B, Limitation of Liability and Warranty**, page 101, describes the limitations on liability and warranty.
- **Appendix C, FCC Compliance**, page 102, provides FCC compliance information.

What's New in Version 7.5.3

As of version 7.5.3, the following features and enhancements are now available:

- The ability to select an attached headset's audio source (either IFB or Video Return)
- *[For HEVC Card owners only]* Select encoding for Store & Forward files: H.264 or HEVC
- Speed Test – measure the total uplink speed from your unit to the output MMH channel

More details on these features appear in the relevant sections inside this manual.

Intended Audience

This user guide is intended to be used by operators of LiveU's LU600 Live Video Uplink unit. We assume that operators have basic computer knowledge and are familiar with any video equipment being used (cameras, microphones and so on) and the networking infrastructure to which these LU600 units are connected.

Additional Documentation

- LiveU Central User Guide
- LiveU LU2000/LU4000 Server (MMH) User Guide
- LiveU Xtender User Guide

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Support and Contact Information

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2 University Plaza Drive
Suite 505
Hackensack, New Jersey, 07601
USA

US: help@liveu.tv

Latin America: soporte@liveu.tv

US & Latin America Phone line: 1-(877)-88-LiveU (54838)

International: support@liveu.tv

International Phone Line: 1-(609)-997-0600

When contacting a support representative, please make sure to have the last five digits of the LU600's serial number available. This can be found by selecting the **About** option, as described in the *About* section on page 49.

1 Introducing the LU600

Overview

The LU600 is a compact lightweight unit that enables you to transmit high-quality SD/HD (and with optional HEVC cards, 4K) video from diverse locations, while adapting to dynamic network conditions. The LU600 provides broadcast-grade video quality and bitrate (20 Mbps), a very high file transfer speed (80 Mbps) and comes with a battery that can provide up to 4 hours of live streaming.

The LU600 connects seamlessly to most commercially available cameras using either SDI or HDMI interfaces, and can support up to four audio channels when using SDI.

The LU600 supports 3G/4G (LTE and Advanced LTE) cellular networks, WiFi links and two Ethernet links.

The LU600 introduces a five-inch capacitive touch screen and a streamlined user interface.

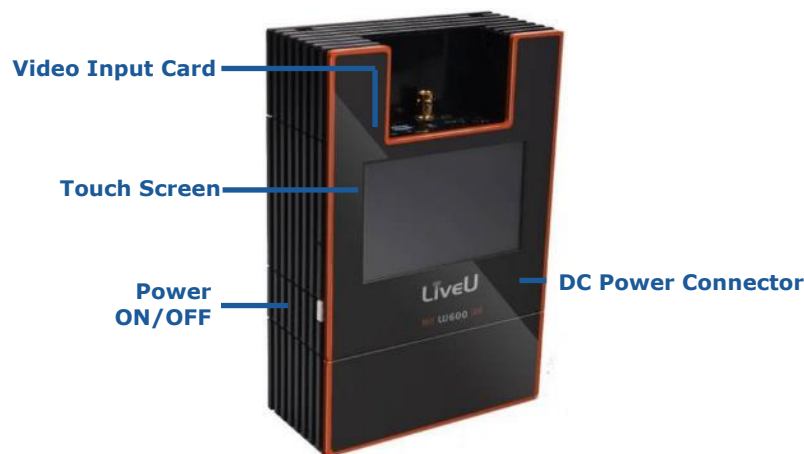


Figure 1: LU600

As the LU600 powers up, it dials (connects) its modems, connects the WiFi / Ethernet interfaces to various networks and combines their bandwidth into a single consolidated broadband uplink connection. The LU600 can then encode incoming video into an H.264 (or HEVC) stream and transmit it over the aggregated bandwidth or use this bandwidth for DataBridge functionality.

The LiveU LU2000 (server) receives these various streams of video via a standard Internet connection. The LU2000 server runs multiple Multi-Media Hub (MMH) instances, where each MMH recombines the streams received from a specific field unit (e.g. the LU600) into a discrete broadcast-quality video stream that can be played out over an integrated SDI interface on the LU2000 or streamed from the LU2000 to a CDN.

The LU2000 is normally installed at a studio or broadcasting center. Alternatively, a cloud-server based MMH instance may be used when SDI output isn't required.

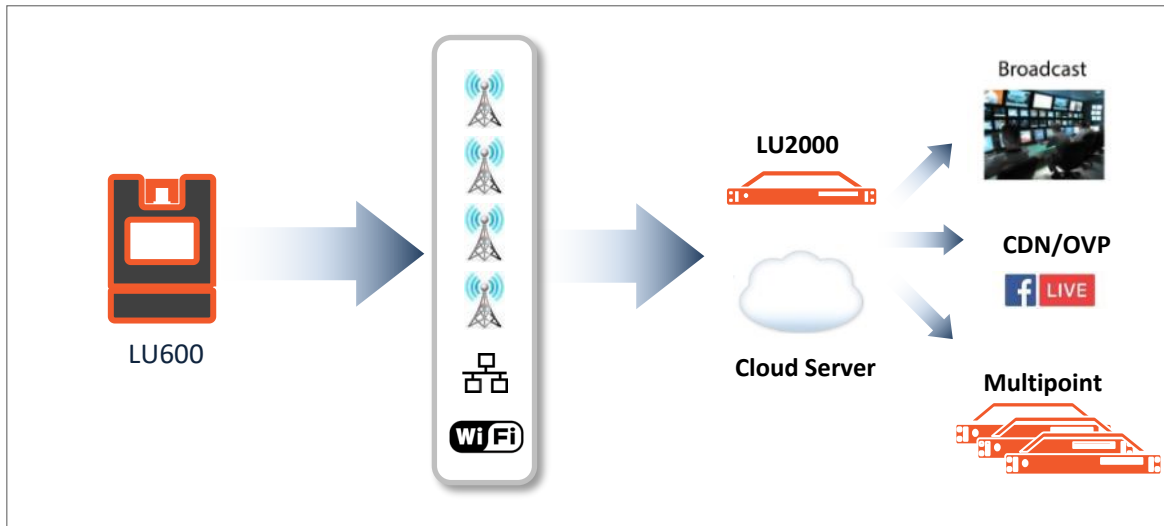


Figure 2: Solution Architecture

Your LU600 (and indeed, any LU2000 that's part of your organization) can be controlled and configured using *LiveU Central*, as described on page 14.

What's in the LU600 Box?

Check that your LU600 box contains the following items:

- LU600 portable video uplink unit & LU600 battery
- LU600 backpack
- AC power adapter (90W 16V) and power cord
- The following cables:
 - SDI cable (BNC to BNC 2.2m)
 - HDMI to Mini HDMI (2.5m)
 - Micro HDMI (Male) to HDMI (Female - Orange), 25cm (for use with the Video Return feature)
- LU600 remote control
- Optional accessories:
 - Anton Bauer/V-mount/PAG camera mount (does not fit the LU600 backpack)

- Anton Bauer/V-mount/PAG battery adapter for powering the LU600 inside the bag

Hardware Configurations

The LU600 has several optional hardware configurations and accessories including different video interface cards, camera-mount configurations and external antenna for specific connectivity scenarios.

Video Interface Cards

The base LU600 comes with the HEVC-HD video interface card that supports HD video input via either SDI or HDMI connectors. This card supports the following video connections: 3G/HD/SD-SDI and HDMI 1.4.

LiveU can also supply optional alternative video interface cards for the provision of 4K video as follows:

4K-SDI

This card supports SDI 4K input and SDI HD input. The card supports the following video connections: 12G/3G/HD/SD-SDI 4x3G-SDI (2SI + SD), supporting all formats of 4x3G-SDI – 2 sample interleave or square division, level A or level B. Please note that this card does not support any HDMI input.



Figure 3: 4K SDI Video Interface Card panel

4K-HDMI

This card allows either 4K HDMI input or SDI HD input, supporting the following connections: 3G/HD/SD-SDI, HDMI 2.0.

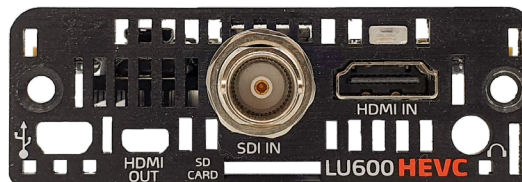


Figure 4: HEVC-HD Video Interface Card panel

4K Video Support

When the above video cards are used, the LU600 is able to support 4K video in all operational modes, i.e. Live, Live & Store, and Store & Forward. Based on the card used, you will be able to use either 4K HDMI or 4K SDI video input, either of which will support the following resolutions: 4Kp50/60/25/30/24, 1080p50/60/25/30/24, 1080i50/60, 720p50/60/25/30, PAL, NTSC

Camera-Mount Configurations

The LU600 can be ordered in 3 different camera mount configurations, suitable for working with batteries from Anton Bauer, V-Mount and PAG.



Figure 5: Camera-Mount Configuration (for V-Mount)

External Antenna Enclosure

Your LU600 contains from 6 to 8 cellular modules that provide enhanced connectivity in normal operational scenarios. If for any reason, you wish to connect external antenna to these modems, LiveU provides the option to upgrade your unit to an LU600-SMA configuration. Please contact your LiveU sales rep for more information.



Figure 6: LU600-SMA

External Antenna Accessory

As part of the accessories available for the LU600, LiveU offers external cellular antennas (part number ANT0026) that were tested and found to be highly compatible with the LU600.



Figure 7: External Cellular Antenna (ANT00026)

These antennae have the following advantages:

- Hi-Performance Antennas (-3dBi)
- Each antenna has 2 internal cellular antenna and can be connected to two different cellular modules on the LU600-SMA.

We recommend placing the antennas at least 20cm from each other when connecting multiple antennas to the LU600.

The antenna has a 3-meter cable with an SMA connector that can be extended, however we do not recommend extension as this may affect antenna performance.

LiveU Central

LiveU Central is a web interface that lets you access any LiveU field unit you have, including the LU600. LiveU Central runs in any modern web browser such as Google Chrome, Internet Explorer or Firefox and allows you to view an LU600's status and to remotely configure an LU600 and an MMH instance (running on the LU2000 server).

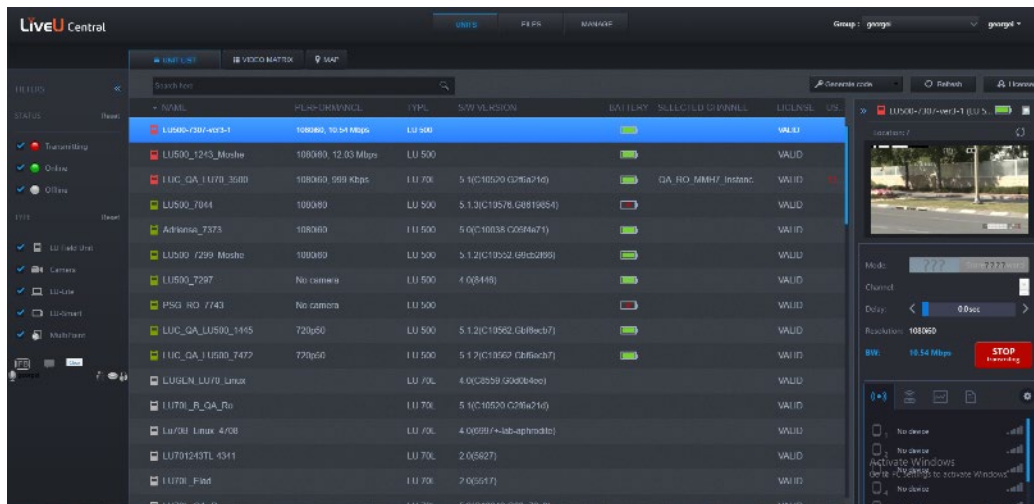


Figure 8: LiveU Central

When LiveU Central takes control of an LU600, the message **Unit is under LiveU Central Remote Control** is displayed on the LU600 unit.

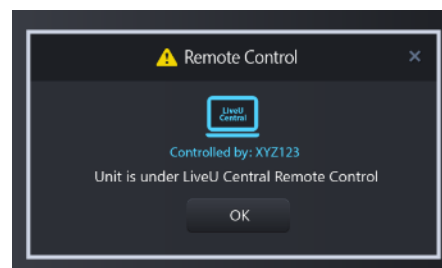


Figure 9: Unit Under Remote Control

This message remains on the screen until the LU600 user taps the **OK** button. This message provides the LU600 user with an indication that the LU600 is/was controlled remotely (and possibly that its configuration was changed). The LU600 user can tap this button at any time without affecting the control.

Please refer to the *LiveU Central User Guide* for more detailed information.

2 Quick Start

This chapter describes how to get started using the LU600 and describes the **Home** screen and its options.

Getting Started

The following describes the basic workflow for using the LU600:

- 1 Power on the LU600 as described in the Powering On the LU600 Unit section on page 22.
- 2 Connect a video camera to the unit, as described in the Connecting the Video Camera section on page 24.
- 3 Select the mode of operation as described in the Streaming Operation Mode Selection section on page 26.
- 4 [optionally] If you have the Metadata service enabled for your unit, set the metadata fields accordingly, as described in the chapter on Metadata, page 74
- 5 Based on the current mode of operation, do the following:
 - For **Live** mode, set the delay, as described in the Setting Delay section on page 32.
 - For **Store & Forward** mode, set the quality and codec for streaming. For more details, refer to the Specifying Store & Forward Streaming Quality section on page 27.
- 6 Select the output channel for your transmission as described in Selecting an Output Channel section on page 28.
- 7 Start streaming, as described in the Going Live section on page 43.

LU600 Home Screen

The LU600 user interface is accessed via the LCD touch screen. The *Home* screen automatically displays when the unit is powered on.

All LU600 functionality is accessible directly from the *Home* screen.

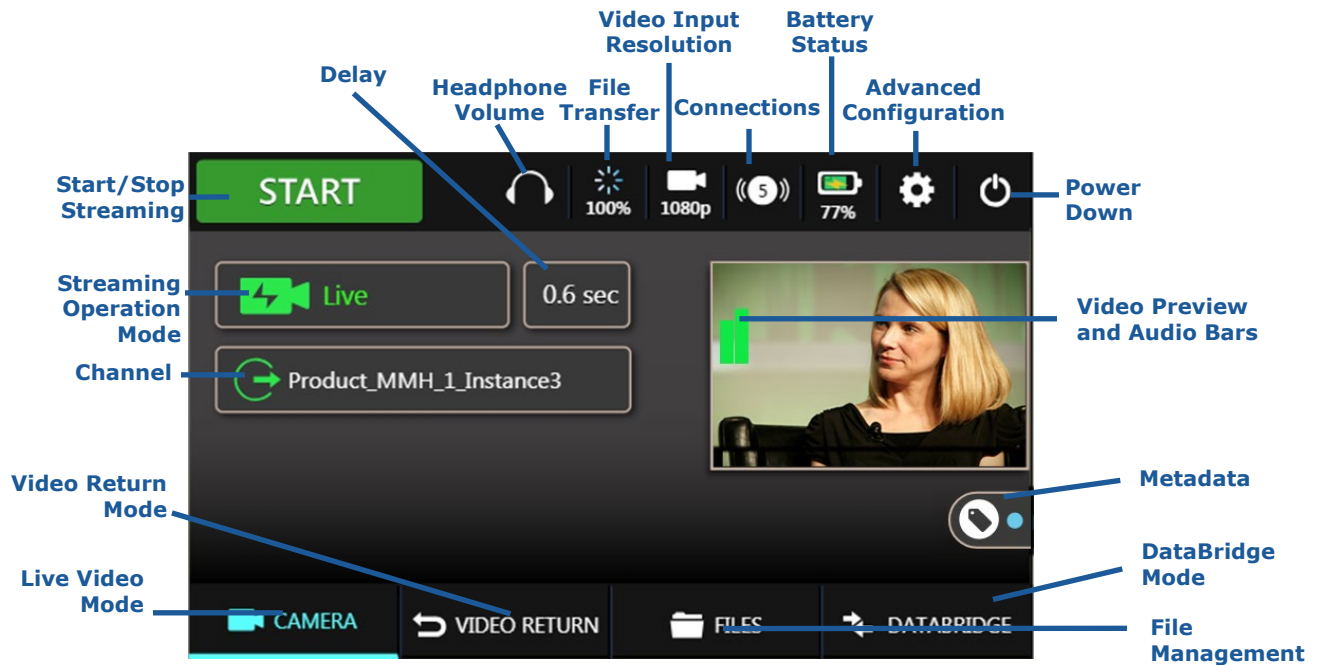


Figure 10: LiveU LU600 Home Screen

The *Home* screen provides various buttons, icons and indicators for controlling the unit and its broadcast, as follows:

- **Battery Status**, page 20
- **Preview and Audio Bars**, page 20
- **IFB Headphone Detection & Control**, page 21
- **Video Input Resolution**, page 25
- **Streaming Operation Mode Selection**, page 26
- **Channel**, page 28
- **Delay**, page 32
- **Connections**, page 33
- **Start/Stop Streaming**, page 43
- **Power Down**, page 44
- **Advanced Configuration**, page 46
- **File Management**, page 58
- **File Transfer Status**, page 62

- **Video Return**, page 64
- **DataBridge**, page 67
- **Metadata**, page 74

Video Preview and Audio Bars

This area of the *Home* screen automatically shows a preview of the incoming video feed after the camera is connected and turned on. On the left part of the video, you should be able to see two audio bars (Left and Right). Note that when using an HEVC Pro video card, the audio bars will appear to the right. Additionally, if your audio input was defined as 4 channels, this will be reflected in the audio bar display on screen.

The video feed is displayed a few seconds after the camera is connected and automatically detected by the LU600. If the LU600 cannot detect any incoming video, this area will display a message "Camera Not Connected".



Figure 11: Camera Not Connected message

Battery Status

This icon displays battery charge as follows:

-  Green: The battery is charged 20% or more
-  Yellow: The battery is charged between 10% to 20%
-  Red: The battery is charged between 5% to 10%
-  Flashing Red: The battery is charged less than 5%

For a more precise battery status, tap on the battery icon. A screen will open that shows percentage charge, and estimated operation time remaining, based on your usage pattern of the LU600.

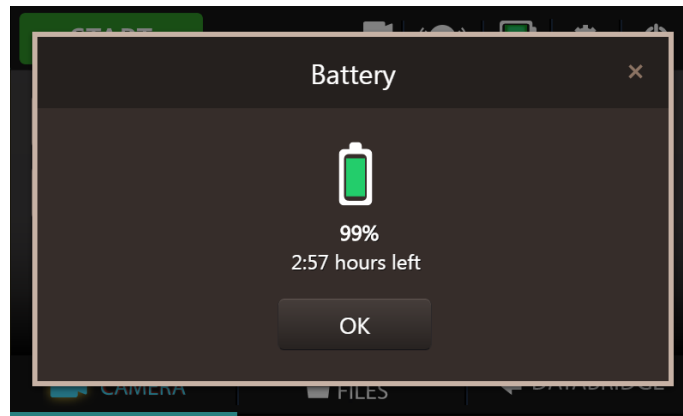


Figure 12: LiveU LU600 Battery Status Screen

IFB Headphone Detection & Control



A headphone icon will appear whenever a headphone is plugged into the audio jack on the video card. Tapping this icon will open the IFB Volume screen, allowing you to change the volume of any incoming audio signal, and to select the audio source, either IFB or the Video Return feed.

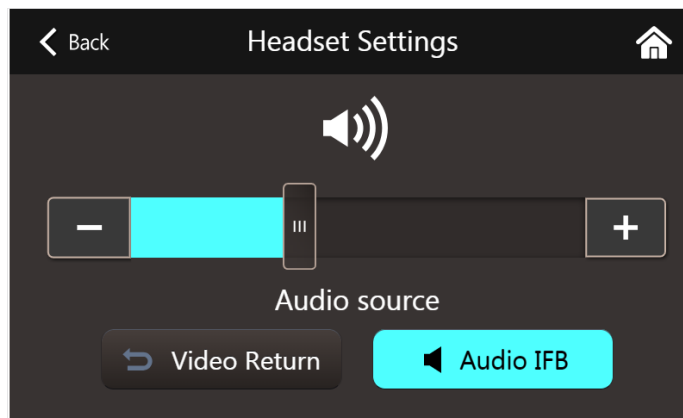


Figure 13: IFB Volume Screen

- Select the audio source by pressing on either the Video Return or the Audio IFB buttons.
- Move the slider right or left, to raise or lower the volume of any incoming audio.
- To mute incoming audio altogether, move the slider all the way to the left. Once you have exited this screen (either by tapping on Back, or on the Home icon), the headphones icon will show as muted.



3 Using the LU600

This chapter describes the functionality of the LU600 and its operation. It contains the following sections:

- **Powering On the LU600 Unit**, page 22
- **Connecting the Video Camera**, page 24
- **Streaming Operation Mode Selection**, page 26
- **Specifying Store & Forward Streaming Quality**, page 27
- **Setting Delay**, page 32
- **Handling Network Connections**, page 33
- **Going Live**, page 43
- **Shutting Down**, page 44

Powering On the LU600 Unit

The following describes the procedure for charging and turning on the LU600.

Charging the LU600

The LU600 comes with a battery that enables up to four hours of standalone operation when fully charged. If this is the first time that this LU600 is being used, then you may have to attach the battery to the main unit as described in the *Attaching and Replacing a Battery* section on page 86. We recommend charging the battery for at least 6 hours before first using the LU600.

To charge the battery:

- Plug the AC Power Adapter into the DC IN connector on the LU600 while the battery is connected to the LU600.

While charging, the LED near the DC IN connector will be red. When the battery is fully charged, this LED will turn green. Note that the battery charges even when the unit is turned off.



Figure 14: DC IN Connector

It is good practice to keep the unit plugged into a power outlet when it is not in use, ensuring it is charged and ready for operation at a moment's notice.

To turn on the LU600 unit:

- 1 Press the Power button for approximately two seconds until the LU600 lights up. The battery does not need to be fully charged to use the unit. The entire boot-up and modem connection process typically takes under 30 seconds.



Figure 15: Power Switch

- 2 If the camera is on, properly configured and connected to the LU600, then the LU600 screen should display the scene that the camera is capturing, as shown below

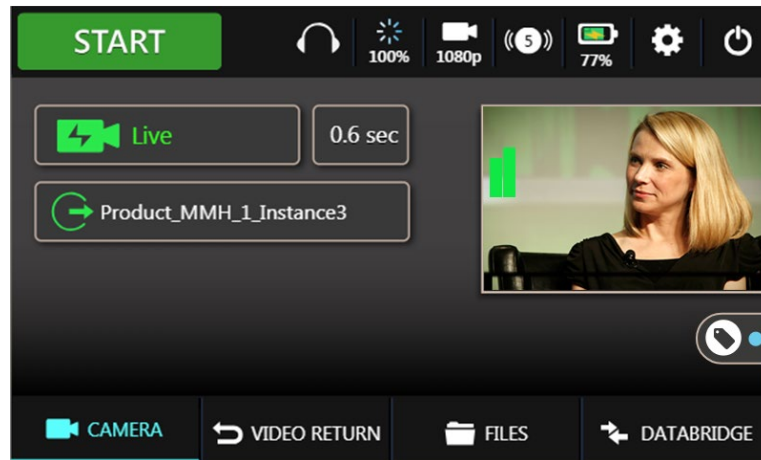


Figure 16: LU600 Screen Showing Camera Scene

Connecting the Video Camera

To connect the camera:

- 1 Connect an SDI or HDMI cable to the video-out port on the video camera.
- 2 Connect the other end of the cable to the appropriate port (SDI or HDMI) on the LU600 unit (when outside the backpack), or to the appropriate cable extender when the LU600 is inside the backpack.



Figure 17: LU600 Unit Camera Connections



Figure 18: LU600 Unit Cable Extensions

The camera can be connected either before or after turning on the LU600. Please note that only one camera can be connected directly to the LU600 at any time.

Viewing the Camera Resolution

The camera icon in the taskbar reflects the camera connection status and the detected incoming resolution:

-  Camera is connected (and sending video at 1080i resolution for example)
-  Camera is not connected.

If no camera is connected when pressing **Start**, the following displays:

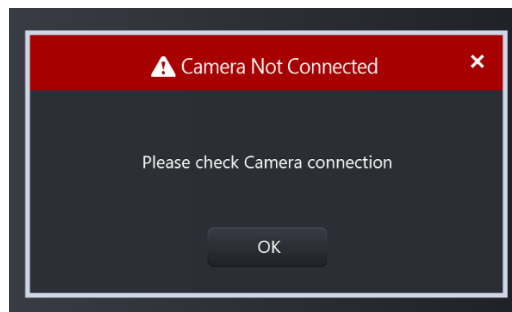


Figure 19: Camera Not Connected

You can see the currently detected input resolution by tapping the camera icon, for example:

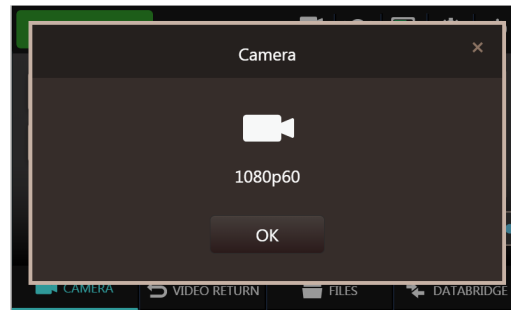


Figure 20: Currently Detected Video Input Resolution

Streaming Operation Mode Selection

The LU600 provides two streaming operational profiles which determine what and how the LU600 will stream:

- **Live:** When selecting this profile, the LU600 automatically starts streaming any incoming video when it goes live (as described in the *Step 7, Going Live* section on page 43). This is the default profile. Video is streamed according to the delay that is specified in the *Main* screen. Note that when an HEVC Pro card is installed, Live & Store mode will be automatically enabled when going live. For more details please see Live & Store on page 50
- **Store & Forward:** When this profile is selected, the LU600 stores incoming video on internal storage or on an installed micro SD card, while simultaneously uploading the stored video at the highest quality. You can configure Store & Forward quality and other related parameters in the Configuration menu. For more details see page 50

NOTE

The micro SD card must be at least a 4GB, Class 10  SD card from an established manufacturer. The LU600 supports micro SD cards of up to 2TB.

The **Store & Forward** profile is typically used when you are in an area with limited bandwidth as it allows you to store the video on the LU600 unit and to transmit it once bandwidth improves. When this option is selected, the **Delay** option is not active.

To select a profile:

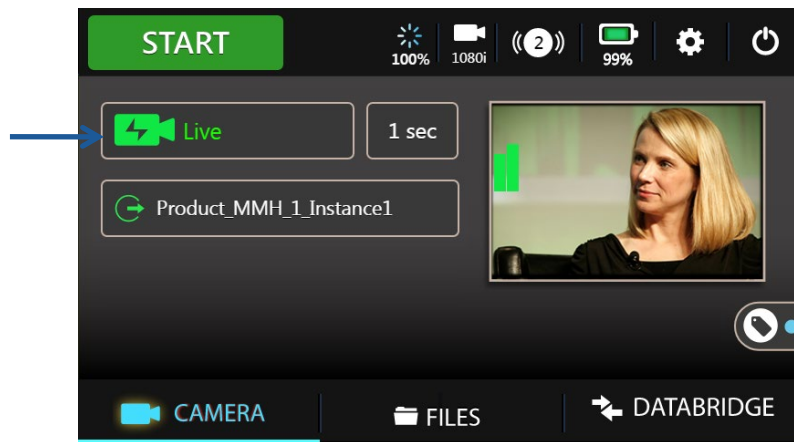


Figure 21: Selecting Operating Mode - 1

Tap the **Live** button (as shown above in Figure 21) to display the following screen. Select either Live or Store & Forward video mode.

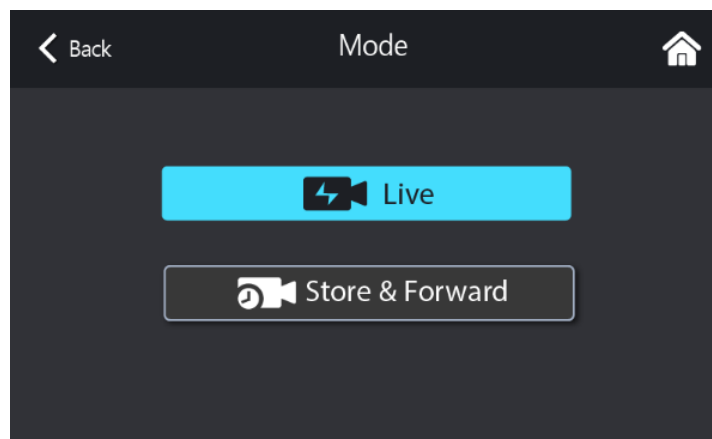


Figure 22: Selecting the Operating Mode

Specifying Store & Forward Streaming Quality

If you have selected the Store & Forward profile you may now configure the quality and encoding standard (H.264 or HEVC) of the file to be stored during Store & Forward sessions.

NOTE: For HEVC Card owners, please use this configuration to determine the quality and encoding standard (H.264 or HEVC) of the "Live & Store" file saved locally whenever going live.

To specify the streaming quality:

- 1 Tap the **Quality**  button to display the following screen:

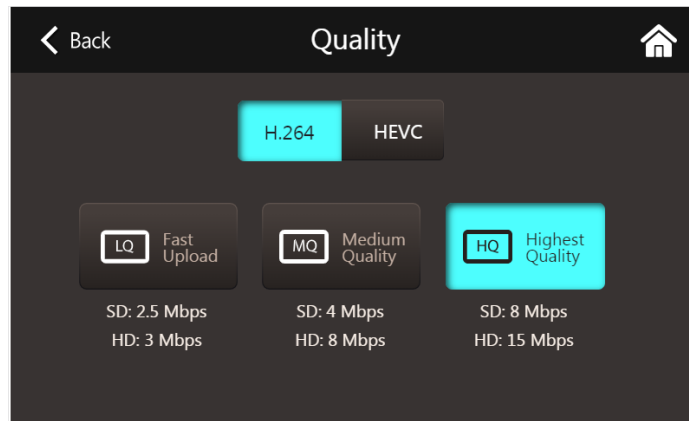
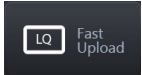


Figure 23: Setting the Streaming Quality

- 1 On units with an HEVC Card, you can select either H.264 or HEVC by tapping the relevant button. On units with no HEVC card, your files will be saved in H.264 format.
- 2 Tap the quality option that you prefer:
 -  Low video bit rate to allow fast file uploads to the server. This option is recommended in case of urgency and when network coverage is low.
 -  Medium bit rate. Provides good video quality with relatively fast file uploads.
 -  Highest bit rate. Provides the best video quality with the slowest file uploads. This option is recommended when the highest quality is required and network performance is high, or when there is no urgency in video arrival at the studio.

Selecting an Output Channel

You will need to define where your LU600 is going to send its output to. This step is mandatory the first time that you use the LU600, after which the LU600 will use the same destination channel until changed.

To select a channel:

- 1 Tap the Channel  CNN-1 Newsroom_Chane... button to display the following screen:

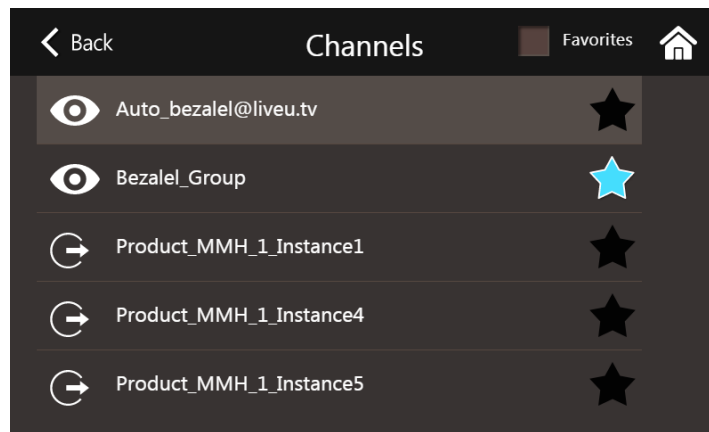


Figure 24: Selecting a Channel

The channel icons next to the channel name reflects the channel type as follows:

-  Channel is a Virtual Group (see below)
-  Channel is connected to an SDI output

- 2 Tap the channel to which you would like to stream. You can use the slider to scroll through the channels.

Once the channel is selected, the main screen should be displayed with the **Start/Stop Stream** button, as shown below

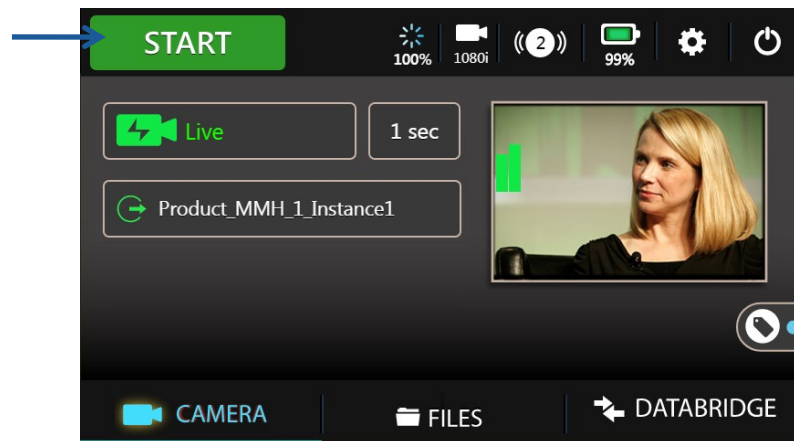


Figure 25: Ready to Go Live

Channel Status Display

Once you have chosen your (non-preview) output channel, you will notice that the channel icon will appear in GREEN if the channel is free, or in RED, if the channel is busy, i.e. currently assigned to a different field unit. If the channel is indeed busy, you won't be able to start the Live broadcast, and will receive the following window when pressing the START button:

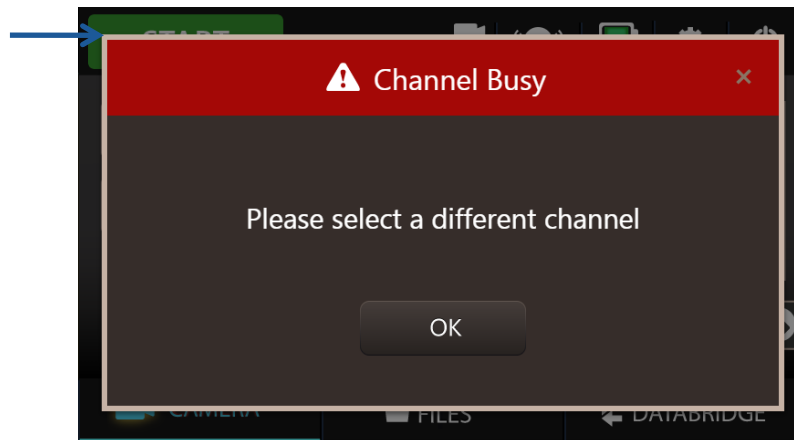


Figure 26: Channel Busy message

Streaming to a Preview Channel (Virtual Group)

You might want to have your stream visible in LiveU Central without worrying about exactly which output it's being routed to. This can be done by streaming to a Virtual Group, which allows LiveU Central operators to preview the channel and then control the destination to which the stream is ultimately directed and sent live.

Virtual Groups are indicated in the *Channels* screen by the  icon before the channel name as shown below:

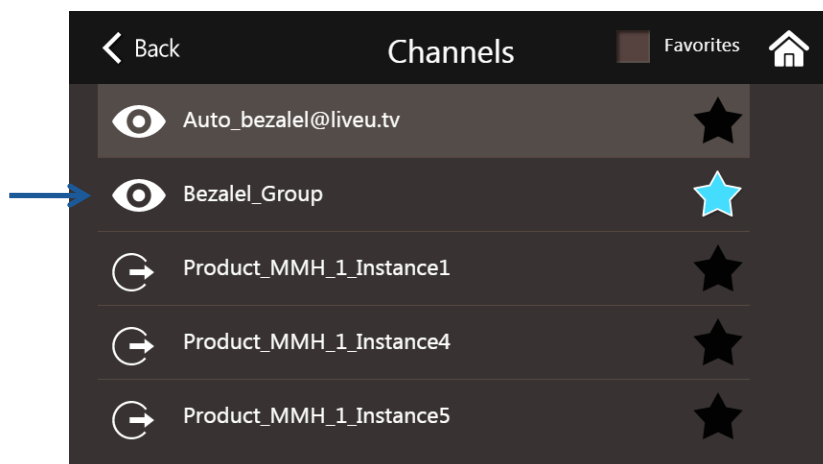


Figure 27: Virtual Channel

When you select a Virtual Group to stream to, the video will be streamed as a “light stream” (low bandwidth, at lower resolution and frame rate) preview channel to LiveU Central.

Once a LiveU Central operator has allocated a Virtual Channel in Preview mode to a destination (SDI or CDN output), it is streamed at the appropriately defined resolution and frame rate. For more details about handling preview channels, see the *LiveU Central User Guide*.

To stop a Virtual Channel stream in Preview mode, tap the  button. This returns the LU600 to Ready state and the video will no longer stream.

You **cannot** define when the Virtual Channel in Preview mode goes live. This can only be performed by a LiveU Central operator. When the LiveU Central operator defines that a Preview channel is live, the **Preview** indication changes to **Live**.

When a LiveU Central operator changes a video stream from Preview to Live, that stream stops for a few seconds and then starts again.

Marking a Channel as a Favorite

Favorite channels are indicated by a blue star  in the *Channels* screen.

To mark a channel as a favorite channel:

- In the *Channels* screen, tap the channel you want to mark as a favorites channel. Its black star changes to a blue star.

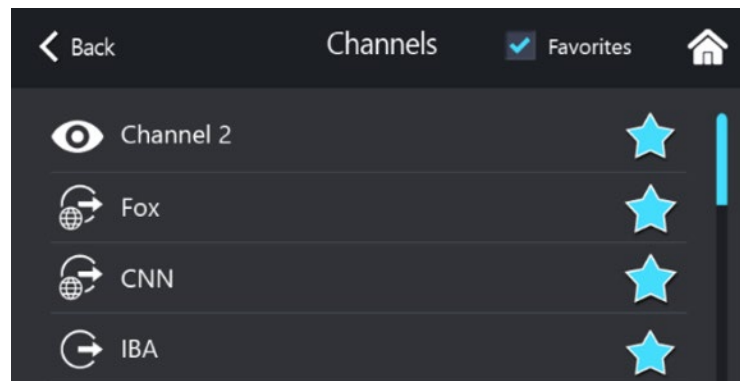


Figure 28: Marking a Favorite Channel

To display only favorite channels:

- In the *Channels* screen, check the **Favorites** checkbox. Checking this checkbox displays only favorite channels in the channel list.

Setting Delay

Live video will be transmitted at the delay defined. The default delay is **5** seconds, which provides the best of both worlds: low delay and high-quality video. The minimum delay is **0.6** second. The maximum delay is 20 seconds.

To set the delay:

- 1 Tap the **Delay**  button to display the following screen:

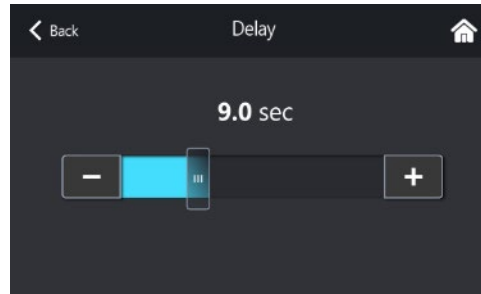


Figure 29: Setting the Delay

- 2 Use the slider to adjust the delay value. The LU600 will use this value until changed.

Here are some guidelines for selecting the delay that best suits your current delay-versus-quality requirements:

- **Delay of 0.6 – 4 Seconds:** Provides the maximum quality within the constraints of the shortest delay. This profile is resilient to changes (errors) and adapts quickly to bandwidth changes.
- **Delay of 5 – 9 Seconds:** This option generally provides the best of both worlds: lower delay and high-quality video.
- **Delay of 10 – 20 Seconds:** Prioritizes high-quality video over lower delay and is suitable for most purposes.

NOTE: Whenever a delay value of under 1 second is selected, the LU600 will show a warning message, recommending to only select values under 1 second when connected to a high speed internet network.

NOTE: Delay values of 0.7 seconds or lower are **NOT** recommended when your unit is only connected via Cellular networks.

Handling Network Connections

Tap the **Connections**  button in the *Home* screen to display the *Connections* screen which lists the interfaces that the LU600 can connect to. The LU600 will automatically attempt to connect to all its interfaces whenever powered on.

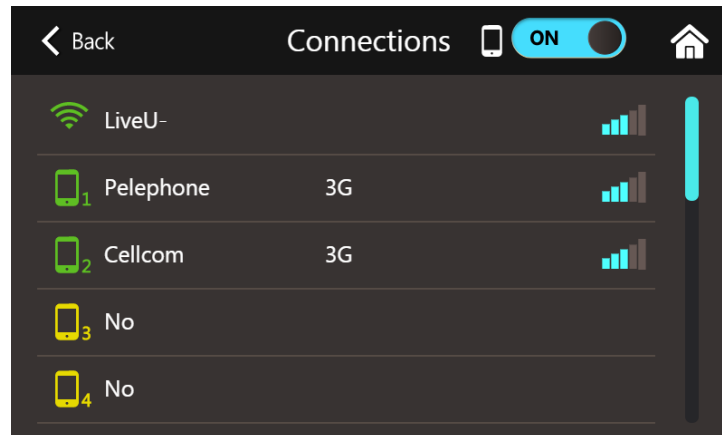


Figure 30: Connections Screen

NOTE

The **Connections**  button displays the number of connected interfaces within the circle on the button in the *Home* screen (in this case, 3).

- Each row in the list is numbered and represents a different interface. The interface type is indicated by an icon, as follows:
 -  **Cellular**
 -  **Ethernet**
 -  **WiFi**
 -  [Optional] Dual-SIM Cellular Module – this icon will also show the SIM slot currently being used, either “A” or “B”
- The color of the icon indicates the status of the connection, as follows:
 - **Green:** Specifies that the interface is connected. It also displays its current streaming bandwidth and signal strength, where appropriate.
 - **Yellow:** Specifies that the connection is in progress.
 - **Gray:** Specifies that the connection is disabled by the user.
- Use the  button at the top of the screen to enable or disable ALL cellular interfaces on the LU600. When set to ON, all interface types in the *Connections* screen are turned on. When OFF, all the cellular connections are turned off and only WiFi and Ethernet interfaces will be used and displayed.

- Each active interface on the *Connections* screen will display 0 kbps while the LU600 is not streaming, actual bandwidth will be displayed once the unit starts streaming.
- Tap an interface in the list to configure it.
- Xtender interfaces appear in the Connections screen once an Xtender is connected. You may refer to the *LiveU Xtender User Guide* for a description of the **AP** and **Client** interfaces connected to the Xtender.

Cellular Interfaces

When tapping on a Cellular connection from the Connections screen, you will be taken to the Cellular Interface screen for that connection / modem. This screen shows whether or not the cellular interface is currently connected, the connection technology (3G, 4G etc.) and the strength of the connection. It also allows you to change the APN parameters, and to scan for different mobile networks to connect to when roaming.

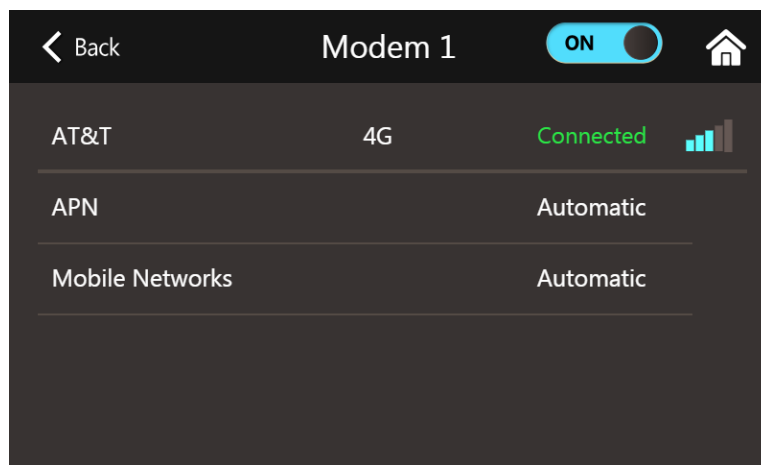


Figure 31: Cellular Interface Screen

You can enable/disable the cellular interface from this screen using the **ON/OFF** toggle switch.

Changing APN Parameters Manually

In certain situations, you might need to change the APN parameters manually in order to successfully connect to the cellular network.

To change APN configuration:

- 1 In the Cellular Interface Screen, tap **APN** to display the following screen:

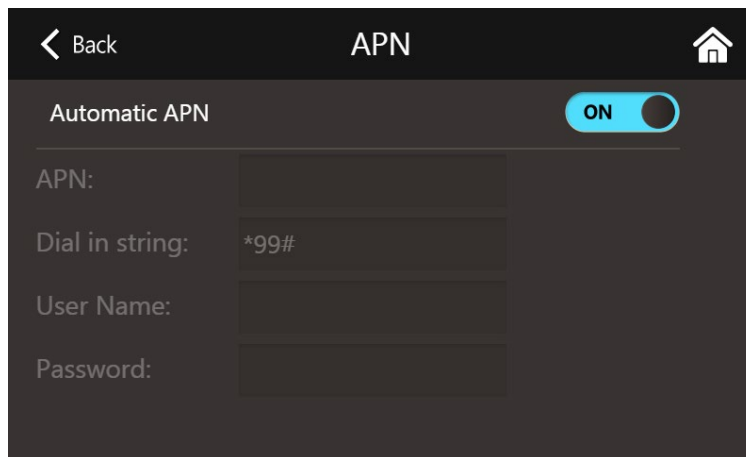


Figure 32: APN Configuration Screen

- 2 Tap the **ON/OFF** toggle button to allow you to change values in the rest of the fields on this screen.

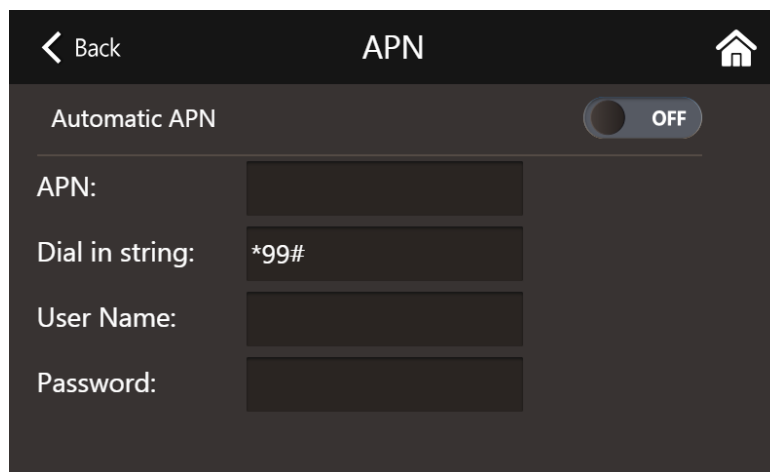


Figure 33: APN Manual Configuration

- 3 Once you have changed whatever necessary, tap on the **Back** at the top of the screen, and the LU600 will attempt to reconnect this interface using the new APN information.

Manual Network Selection

When roaming with the unit, you can select a different network to connect to by tapping **Mobile Networks**, selecting **Scan Networks**, and then choosing the network from the list that eventually appears below.

To manually select Cellular Operator:

- 4 In the Cellular Interface Screen, tap **Mobile Networks** to display the following screen:

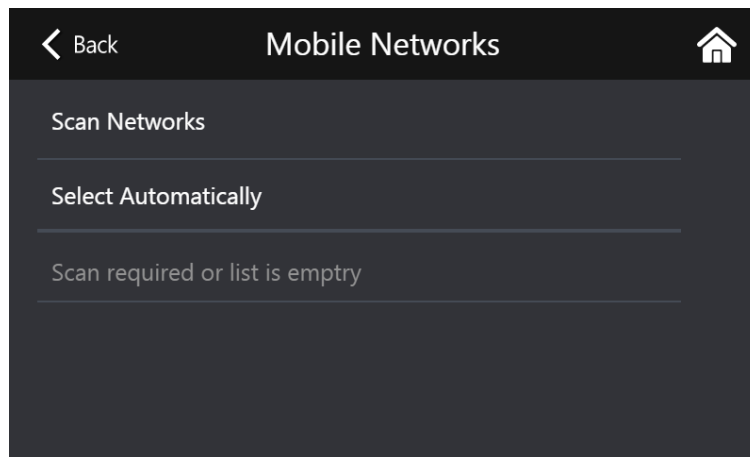


Figure 34: Mobile Network Selection Screen

- 5 Tap **Scan Networks**. The unit will start scanning and display a list of all cellular networks relevant to the SIM installed. This operation may take up to 2 minutes.

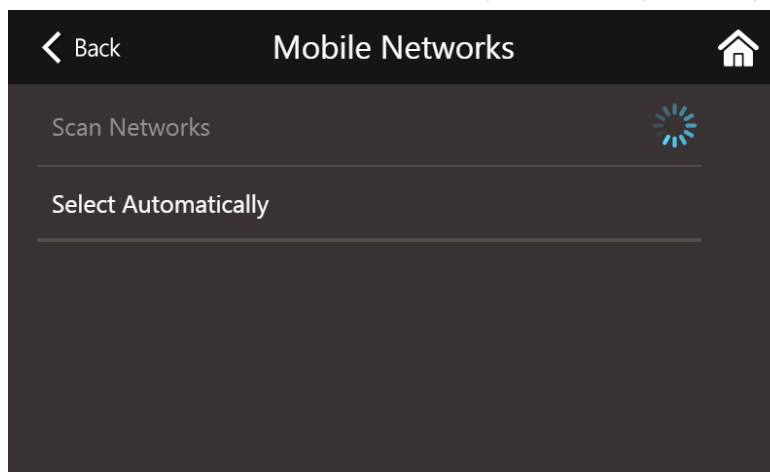


Figure 35: Mobile Network Screen During Scan

- 6 Select the preferred operator. From this moment on, this SIM will always use the operator selected

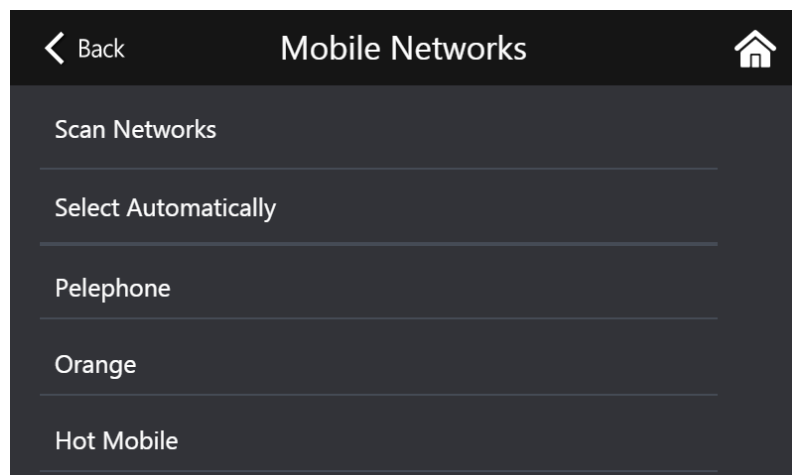


Figure 36: Mobile Network Screen After Scan

- 7 To switch back to automatic selection, tap **Select Automatically**.

Optimized Roaming Pairing (ORP)

Your LU600 supports ORP (Optimized Roaming Pairing). This service provides optimized network operator pairing on roaming SIMs based on LiveU's field experience in different territories worldwide. When left to their default dialing and connection preference, all of the roaming SIMs in your LU600 will tend to pair to the same operator (either due to signal strength or built-in commercial preference). ORP assures that the modems will pair to the 2, 3 or 4 operators that are available in the specific area / country you're in.

Please contact your LiveU sales representative for more details on how to enable this service.

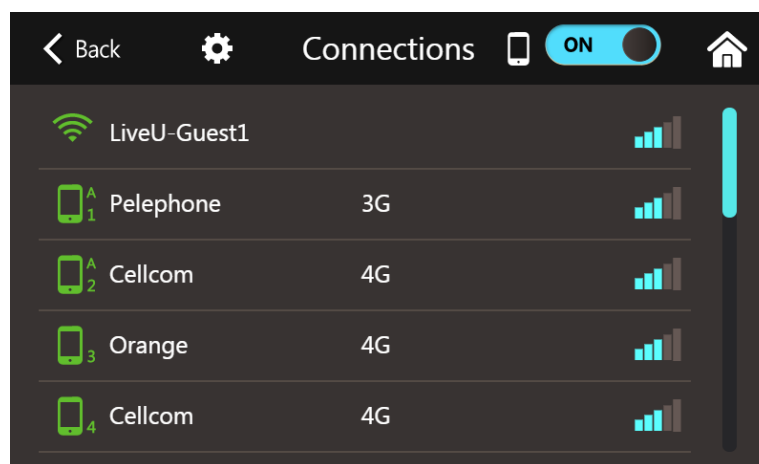
Dual-SIM Modules – GUI Additions

Your LU600 now supports advanced SIM selection functionality when using Dual-SIM modules. For more details on Dual-SIM module hardware, please see Dual-SIM Module Installation on page 84.

Dual-SIM Software Support

If your LU600 unit contains one or more Dual-SIM modules, you will be able to access the following additional functions:

Set global slot selection (A or B) for ALL Dual-SIM modules

**Figure 37: Connections Screen w/Dual-SIM Modules**

To change the SIM slot that your LU600 will use for ALL of the installed Dual-SIM modules, take the following steps:

- Tap the Connections  button on the Home screen to display the Connections screen which lists the interfaces that the LU600 can connect to.

- Now tap on the gear  icon at the top of the screen to open the Connections Setting screen.

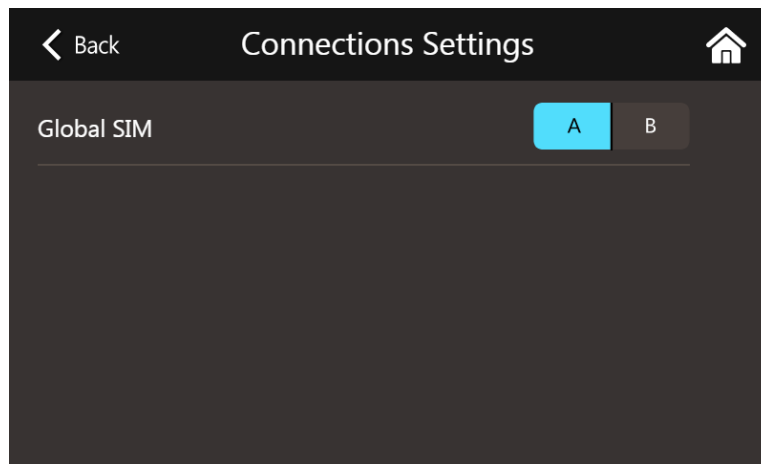


Figure 38: Connections Settings Screen

- Select the SIM slot that you'd like your LU600 to use for all of the installed Dual-SIM modules (A or B). The system will display the following message

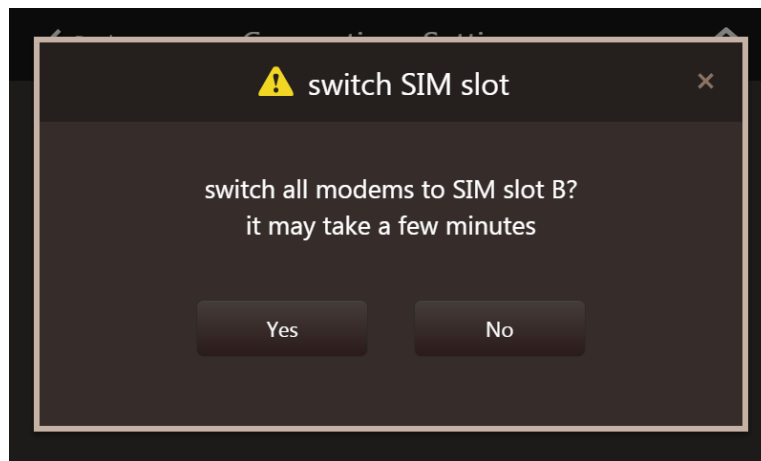


Figure 39: Global SIM Slot Switch Message

- Accept the change by tapping **Yes** or cancel, by tapping **No**. Once accepted, the system will try to reconnect all SIMs in the slot you selected. This may take a few minutes depending on your local network operator configuration.

NOTE

If you have set one or more of the Dual-SIM modules to slot B, the system will display a message immediately following your next reboot of the LU600, reminding you to either switch back, or to leave it as is.

Select the active SIM slot (A or B) on any specific Dual-SIM module

To change the SIM slot that your LU600 will use for any particular Dual-SIM module, take the following steps:

- Tap the Connections  button on the Home screen to display the Connections screen which lists the interfaces that the LU600 can connect to.
- Now tap on the Dual-SIM modem you wish to change, and the Dual-SIM Cellular Interface Screen will open.

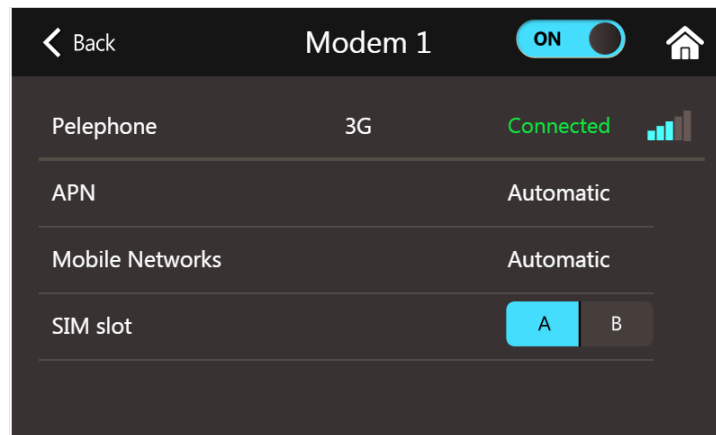


Figure 40: Dual-SIM Cellular Interface Screen

- Select the SIM slot that you'd like your LU600 to use for this Dual-SIM module (A or B). The system will display the following message

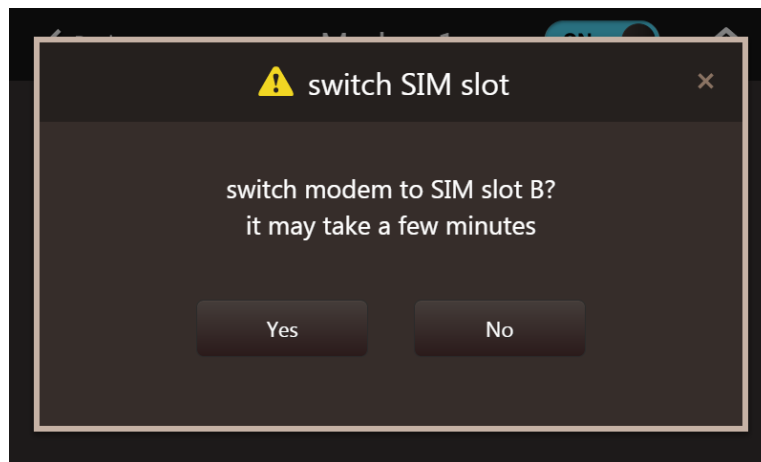


Figure 41: Dual-SIM Slot Switch Message

- Accept the change by tapping **Yes**, or cancel by tapping **No**. Once accepted, the system will try to reconnect the interface, using the SIM in the slot you selected. This may take a few minutes depending on your local network operator configuration.

Ethernet Interface Network Parameters

By default, the IP address of an Ethernet interface is obtained automatically from the DHCP server. If preferred, you can manually configure the IP address and other standard network parameters for the Ethernet interface.

To do so, tap an Ethernet interface in the *Connections* screen (see Figure 42) to display the following screen:

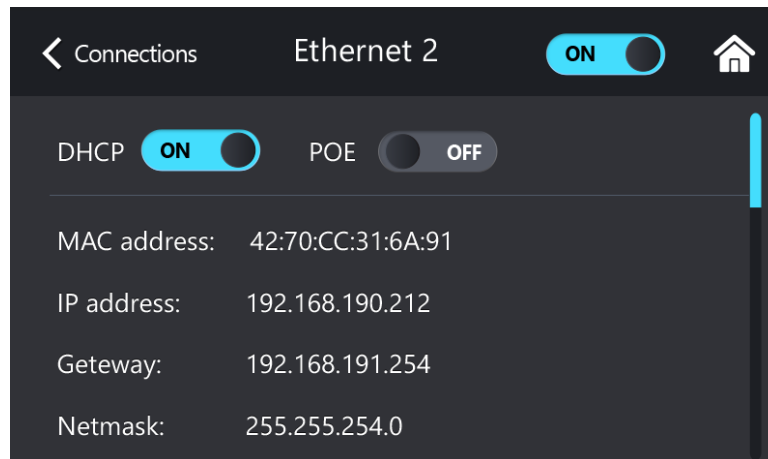


Figure 42: Ethernet Interface Screen – DHCP Enabled

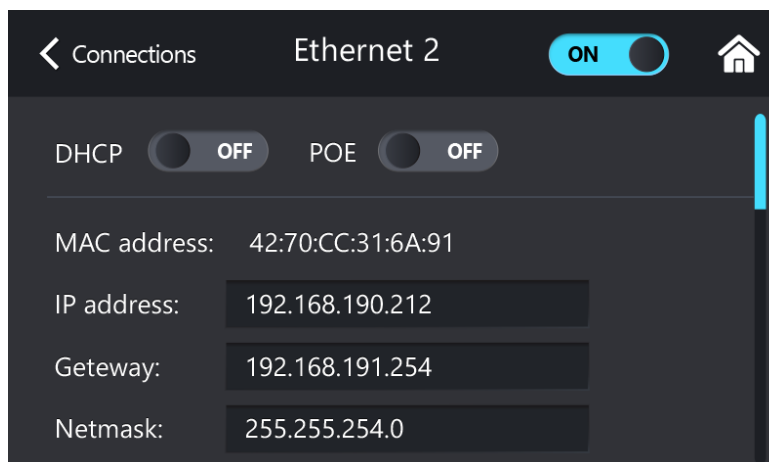


Figure 43: Ethernet Interface Screen – DHCP Disabled

Then, configure the following parameters in this screen:

- **DHCP:** When ON, indicates that the Ethernet configuration is automatically received from the network. This is the default setting. To manually configure the Ethernet network parameters, set the value to OFF and then specify the values for the other fields in the screen.
- **IP Address, Gateway, Subnet, DNS1 and DNS2:** Specify the values for these standard Ethernet connection parameters.

NOTE

If you are unsure about these parameters and their correct configuration, then either set the **DHCP** value to ON so that the configuration is obtained automatically, or contact your system administrator.

Power over Ethernet (PoE) Setting

The LU600 can use its Power over Ethernet (PoE) feature to provide power to a WiFi client, such as the UBIQUITI client used with the Xtender. This replaces the need for the WiFi client to be connected to an external power source. This option is only available for the Ethernet 2 interface, and does not work on Ethernet 1. For more details about PoE and the Xtender, see the *LiveU Xtender User Guide*.

NOTE PoE should only be used for powering up the LiveU WiFi client, and not for any other purpose.

To enable PoE on an interface:

- 1 In the *Connections* screen (see Figure 30), tap an Ethernet interface. The *Ethernet* screen displays.

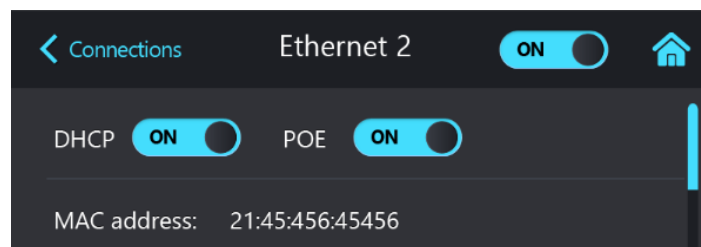


Figure 44: Interfaces Screen – 2

- 2 Set the **POE** value to **ON**.

Configuring WiFi Network Parameters

The LU600 automatically attempts to connect to the most recent WiFi network to which it was connected. The following describes how to connect to a different WiFi network or to connect to a WiFi network for the first time.

The WiFi networks list shows all the WiFi networks detected in the vicinity.

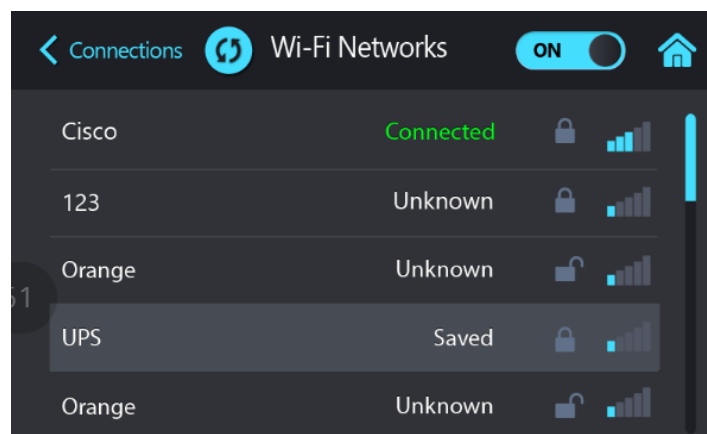


Figure 45: WiFi Networks – 1

The following describes the options that may be displayed for each WiFi network, from left to right:

- WiFi Network Name

- **Network Status:** To indicate the status of the network, which can be one of the following:
 - **Connected:** The WiFi network is currently connected.
 - **Known:** The LU600 has previously connected to this network and knows its password.
 - **Unknown:** The LU600 has not previously connected to this network or does not know its password.
- **Lock** /**No Lock** : Indicates whether this WiFi network is open or encrypted.
- **Signal Strength Indicator**  (SSI)

The following describes the buttons at the top of this screen:

- **Refresh** : Tap this button to rescan the WiFi networks in the vicinity.
- **Enable/Disable WiFi** : Set this button to ON to enable WiFi and OFF to disable WiFi on the LU600.

Connecting to a WiFi Network

Tap a WiFi network in the list to display the  and  buttons for it.

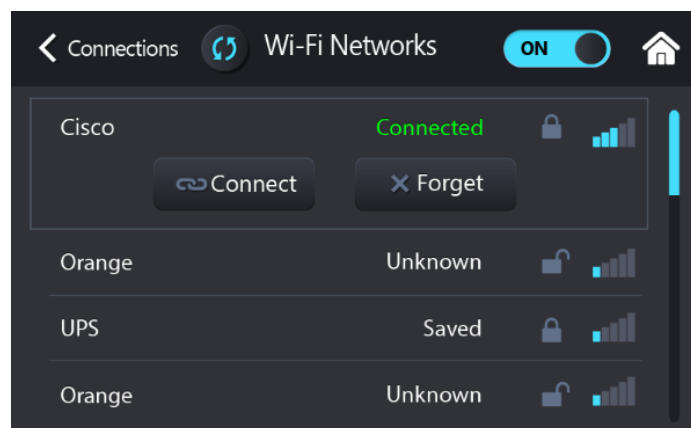


Figure 46: WiFi Networks – 2

Tap  to connect the WiFi network. Tap  to erase the network from the LU600 unit (which changes the network from Known to Unknown).

When a WiFi network is connected, it shows **Connected** in green, as shown below:



Figure 47: WiFi Network Connected

Going Live

Once you are ready to start transmitting video to the channel that you selected, it's time to go live.

To go live:

- 1 Tap the **START** button. All incoming video is now transmitted and should be visible on the screen.

NOTE

When the **START** button is tapped, the LU600 attempts to connect to the selected channel. If the channel is down or unavailable for any reason, the LU600 displays the following message:

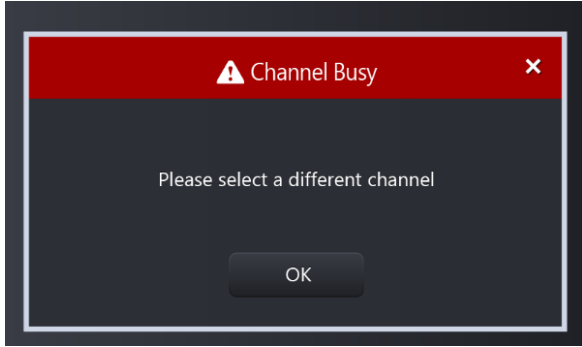


Figure 48: Channel Busy

IMPORTANT NOTE

When streaming to a preview channel, you **cannot** define when the stream goes live. This can only be performed by a LiveU Central operator.

To stop live transmission:

- 1 Tap the STOP button (which replaces the START button while the unit is streaming).

Shutting Down

There are 3 ways to turn off your LU600:

Software

- Tap the **Power Down**  button to display the following screen:

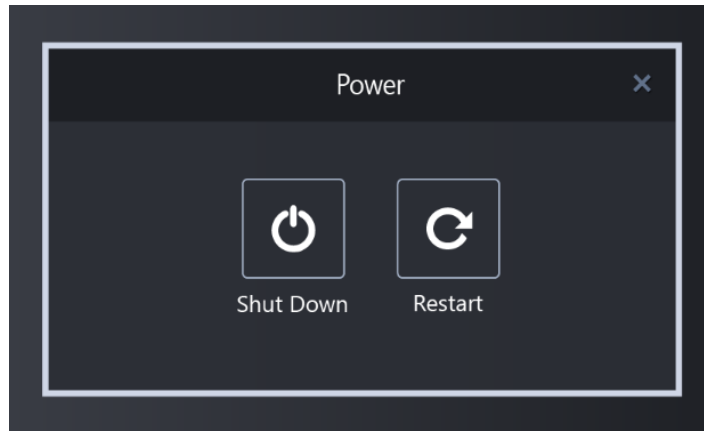


Figure 49: Powering Down – 1

NOTE Pressing **Restart** boots the unit and restarts the LiveU application.

- Tap **Shut Down**. The following screen displays:



Figure 50: Powering Down – 2

- Tap **Yes**. The unit powers down.

Hardware

- Hold down the power button for eight seconds to perform a hard shutdown of the unit.



Figure 51: Power Button

Using the Wired Remote Control

- To turn off the unit, long press the remote button, as follows:
 - **Software Reset (Recommended):** Press and hold the remote button for approximately four seconds. After the status LED starts to blink, the unit starts its shutdown process, which can take approximately 15 seconds to complete. After the unit shuts down, the status LED turns off.
 - **Hard Reset:** Press and hold the remote button for approximately eight seconds. Both the unit and the status LED immediately turn off.

4 Advanced Configuration Settings

This chapter describes how to configure advanced configuration settings on the LU600.

Tap the **Advanced Configuration**  button in the *Home* screen to configure LU600 advanced settings.

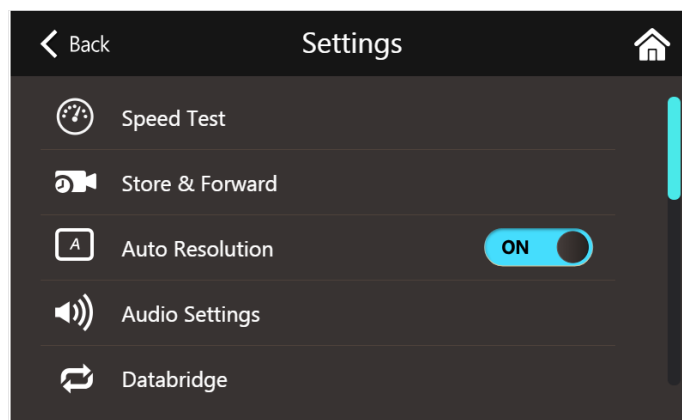


Figure 52: Settings

You can configure the following settings from this screen:

- **Speed Test**, page 47
- **Store & Forward**, page 47
- **Auto Resolution**, page 48
- **Audio Settings**, page 48
- **DataBridge**, page 48
- **About**, page 48

Speed Test

The Speed Test function will allow you to measure the effective connection speed from your unit to the currently chosen output channel. This can be useful when setting up your live session, allowing you to check cellular speeds without connecting a camera.

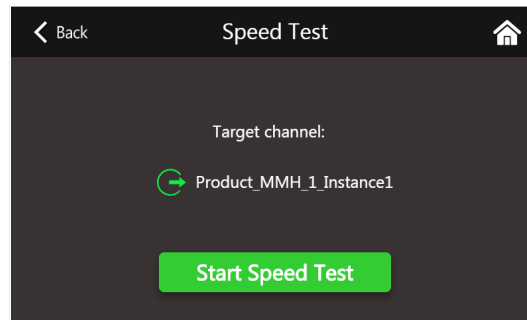


Figure 53: Speed Test

Tap on the Start Speed Test button to start the test.

Speed Test will send data from your unit to the currently selected MMH channel without requiring a camera connection, updating the screen over a 30 second period.

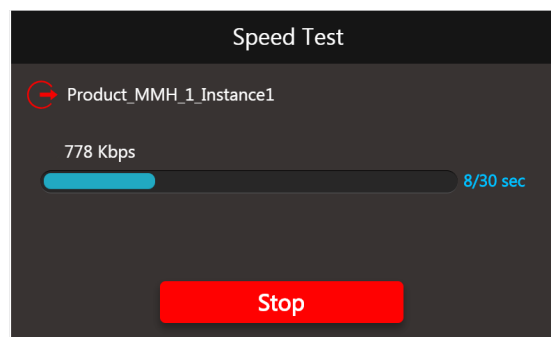


Figure 54: Speed Test in Progress

Once the Speed Test has finished, you will see the result window, where the average channel bandwidth is displayed.

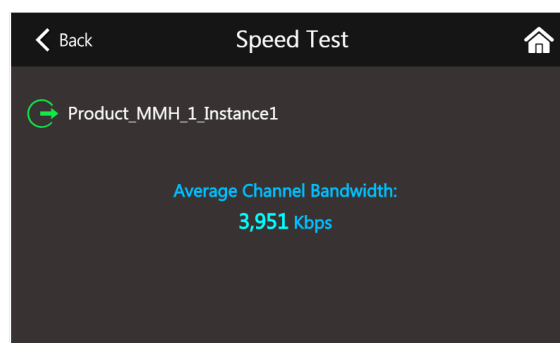


Figure 55: Speed Test Result Window

Store & Forward

The LU600 unit can operate in Store & Forward (S&F) mode, which simultaneously stores incoming video while uploading the stored video to the LU2000 server, as described in *Chapter 5, Store and Forward* on page 50.

Audio Settings

The Audio Settings window allows you to define the number of audio channels (2 Channels or 4 Channels) and Audio Bitrate (96/128/192/200/320 kbps) used by the unit. The default is 2 channels at 96 kbps. Note that 4 Channel input is only supported when using the SDI connection. Setting the LU600 to 4 channels with an HDMI camera plugged in will only use 2 channels at 96 Kbps.

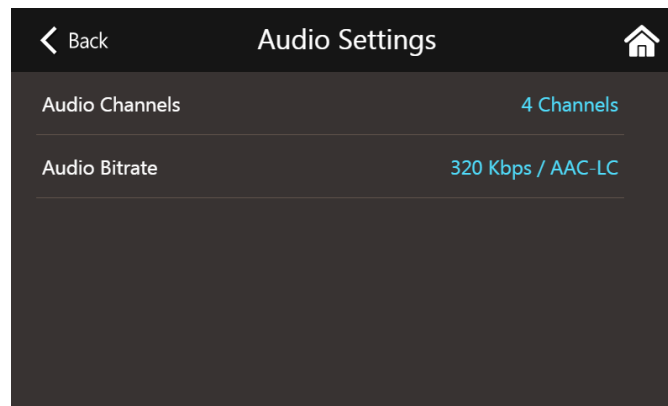


Figure 56: Audio Settings

Setting the Number of Audio Channels

Tap on **Audio Channels** to choose from either 2 Channels or 4 Channels.

Setting the Audio Bitrate

Tap on **Audio Bitrate** to choose from **96**, **128** or **192** Kbps when 2 Channels have been selected, and **200** or **320** Kbps when 4 channels have been selected.

DataBridge

The LU600 unit can provide a general purpose Internet connection when working in DataBridge mode, as described in *Chapter 8, DataBridge Operation* on page 67. For more details about switching to DataBridge mode, see page 68.

Auto Resolution

When Auto Resolution is enabled, the LU600 automatically adjusts the resolution at which it transmits according to the bit rate that is available in order to provide the best available video quality on the server side. This feature is enabled by default and is the recommended mode. Disabling this feature is only required in advanced scenarios (e.g. bypassing transcoding on the server side)

To enable auto resolution:

- In the *Settings* screen (see Figure 52), set **Auto Resolution** to ON.



Figure 57: Auto Resolution

IMPORTANT NOTE

Disabling auto-resolution is not recommended and should only be selected in specific cases.

About

The *About* screen displays the LU600 unit's name, serial number, software version and all enabled services associated with the unit.

To display information about the software version:

- In the *Settings* screen (see Figure 52), tap **About** to display the following screen.

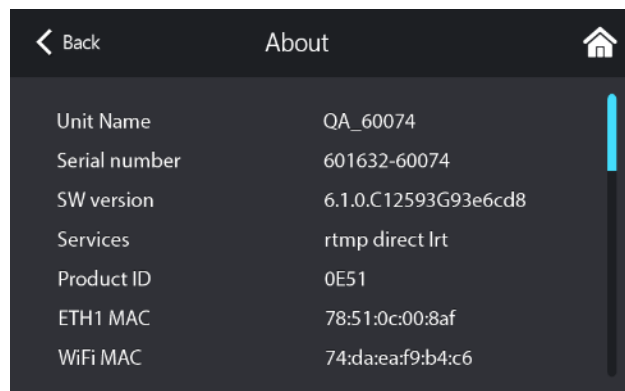


Figure 58: About Screen

NOTE

If a LiveU Xtender is connected to the LU600, information about the Xtender will also be displayed.

When contacting a support representative, make sure to have the last five digits of the LU600 unit's serial number displayed in the screen above available. In the example screen above, that would be **60074**.

5 Store & Forward

This chapter describes how to use the Store & Forward mode on the LU600 unit.

Introducing Store & Forward

The LU600 unit provides a Store & Forward (S&F) mode, which simultaneously stores high-quality video locally on the unit, while uploading the stored video to the destination server (LU2000 or cloud).

You can configure the S&F video quality, the target storage on the LU600 unit (internal or SD card), the LU2000 server to which the video is uploaded and the prefix of the file name that is stored and uploaded.

After the S&F file has been received on the LU2000 server, it can be downloaded locally, played to an SDI interface, chunked (during the file's forwarding phase), renamed or deleted.

The LU600 encodes S&F files at up to 15Mbps video rate, and forwards S&F files at a maximum bitrate of 50Mbps based on available bandwidth.

During a S&F session, the unit can store the file on one of two types of destinations:

- **Internal Storage:** The LU600 comes with internal storage of 16 GB, of which approximately 12 GB can be used for S&F sessions.
- **External Micro SD Card:** The LU600 accepts micro SD cards of 4GB to 2TB capacity. The micro SD card must be a Class 10/UHS-I from an established manufacturer.

Live & Store

Live & Store mode is automatically enabled whenever an HEVC Pro card is installed in your LU600, saving any incoming video locally on your LU600 while simultaneously transmitting live. This feature ensures that you always have a hi-quality copy of your live stream saved, allowing you to enter the FILES tab, and send the file directly to the MCR later in case of congested cellular networks during the live event.

The Store & Forward settings mentioned in this chapter will also affect the location, quality and encoding standard (H.264 or HEVC) of any Live & Store files saved.

Setting Up the Camera

In order to initiate an S&F session, a camera must be connected to the LU600 unit through the SDI or HDMI inputs of the unit.

The camera should be sending video to the LU600 unit (either live, or playing out a previously stored video from the camera's storage).

Configuring S&F on the LU600 Unit

To configure how S&F operates:

- 1 Tap the **Settings**  button in the Home screen. The following displays:

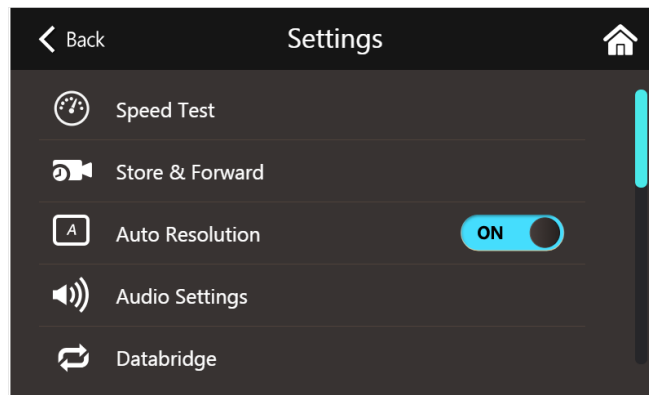


Figure 59: Settings

- 2 Select **Store & Forward**. The following displays:

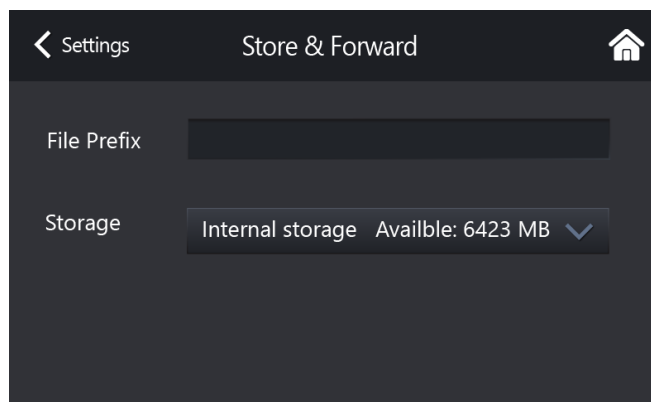


Figure 60: Store & Forward Settings

Setting the File Prefix

The **File Prefix** specifies the prefix to be appended to the filename for the files streamed from the LU600. The prefix enables you to differentiate between files that were stored and forwarded. Do not use special characters or spaces.

Selecting Local Storage

Store & Forward sessions can be stored either on the LU600's internal storage (12 GB) or on an inserted micro SD card.

To select the storage to be used during Store & Forward, tap the dropdown menu and select either the internal storage or the micro SD card.

NOTE

The micro SD card storage size can be from 1GB to 2TB, and must be a Class 10/UHS-I SD card from an established manufacturer.

LU600 supports the following file systems: FAT32, NTFS, exFAT and ext3/ext4. FAT32 supports single file sizes up to 4GB and therefore is not recommended.

Configuring an S&F Session

Perform the following to configure a specific S&F session. This should be done after the camera has been connected and is feeding video into the LU600.

To start an S&F session:

- 1 Tap the  button, shown below:

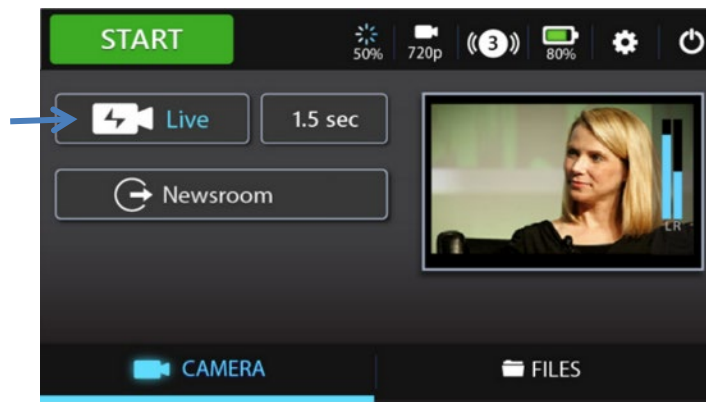


Figure 61: Selecting S&F Mode – 1

The following displays:

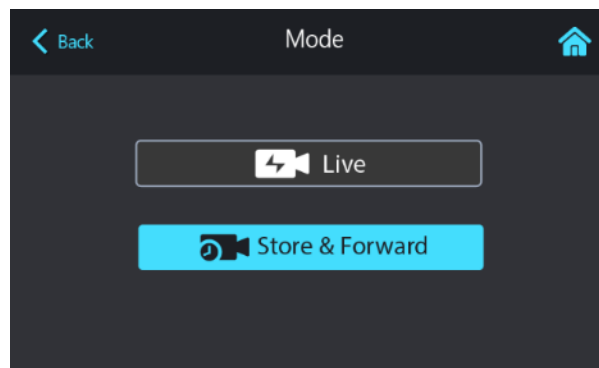


Figure 62: Selecting S&F Mode – 2

- 2 Select **Store & Forward** mode.

- 3 Select the **Quality** button, shown below:

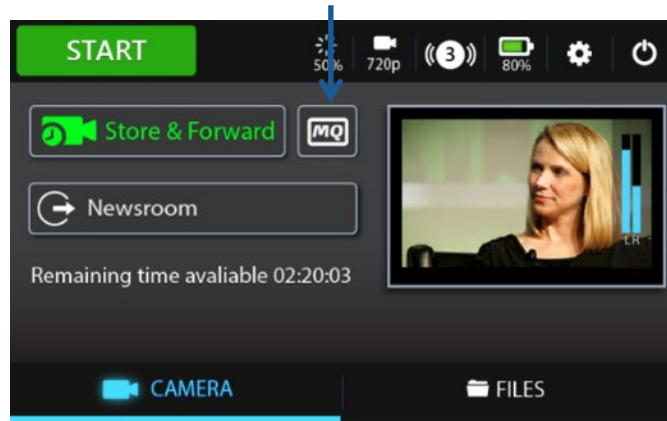


Figure 63: Selecting Quality – 1

The following displays:

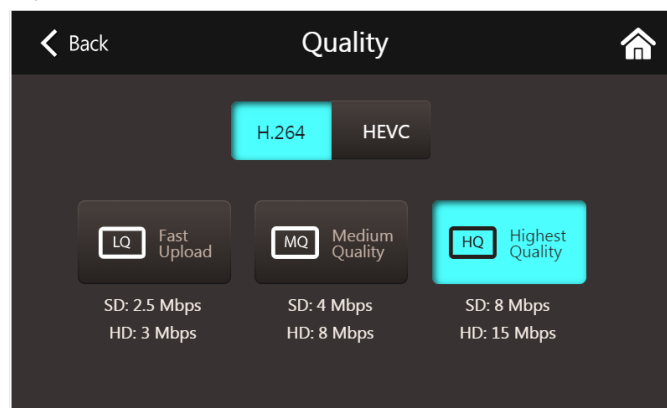


Figure 64: Selecting Quality – 2

- 3 On units with the HEVC Card, you can select either H.264 or HEVC by tapping the relevant button. On units with no HEVC card, you will not be given the option to select HEVC, and your files will be saved in H.264 format.
- 4 Select one of the quality levels:
- **LQ:** Low video bit rate enables quick file upload to the server. This option is recommended for urgent situations when network coverage is low.
 - **MQ:** Medium bit rate. Provides good video quality with relatively quick file upload.
 - **HQ:** Highest bit rate. Provides the best video quality with the slowest file upload. This option is recommended when the highest quality is required and network performance is high, or when it is not urgent for the video to arrive at the studio.

NOTE

The **Remaining storage** indication on the main screen shows the length of time remaining to store the S&F files according to the quality level and the selected target storage.

Starting the S&F Session

To start the S&F session:

- 1 Tap the **START** button, shown below:

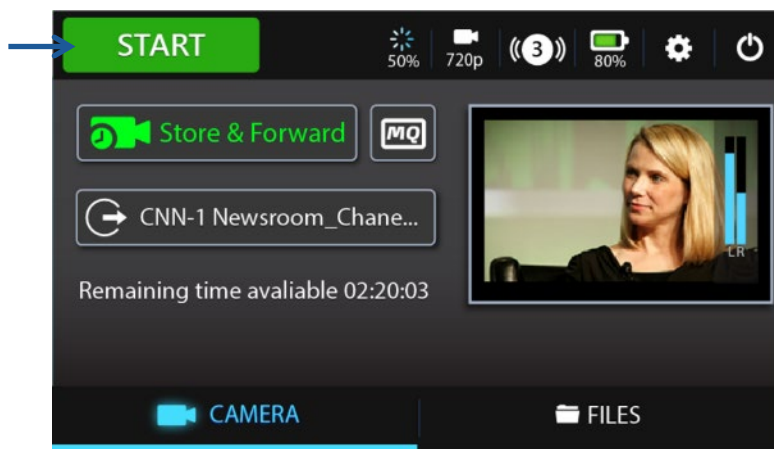


Figure 65: Starting the S&F Session

The following describes the information displayed describing the S&F session in progress:

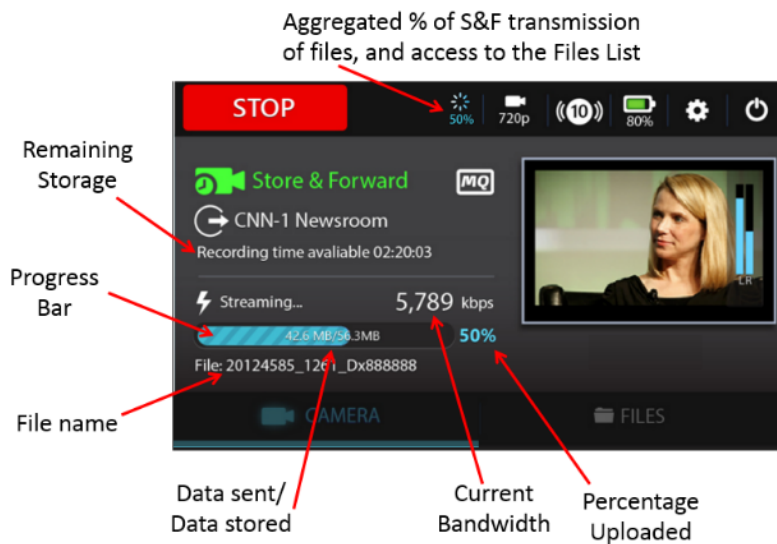


Figure 66: S&F Session in Progress

NOTE

During S&F streaming, both the **Data sent** and the **Data stored** shown in the progress bar increase, but not necessarily at the same rate.

Monitoring S&F Sessions

In addition to the Home screen (shown on the previous page), you can monitor the status of your S&F progress by using the Files Transfer Info log.

Monitoring – Files Transfer Info Log Screen

The Files Transfer Info screen lists the files transmitted using S&F, including files currently being transmitted and files transmitted in previous sessions.

To display the Files Transfer Info list:

- While your S&F session is active, tap the  progress indicator at the top of the screen (this indicator shows the overall progress of all the current file transfers from the LU600).

The following display shows information about the files being uploaded and their status, including the time remaining and the upload percentage status:

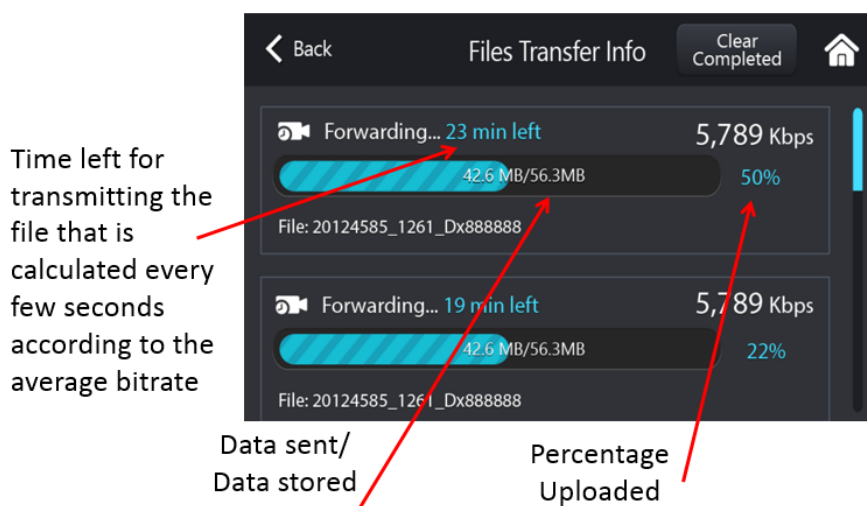


Figure 67: Monitoring an S&F Session

This screen can also be displayed after the file(s) finish uploading. In this case, the indicator shows 100%.

To remove any files that have uploaded successfully from the list, tap the **Clear Completed** button.

NOTE

The progress indicator icon that enables you to display the Files Transfer Info screen will not appear on the Home screen if the File Transfer List is empty.

More Options

Tap on a file transmission row in this screen to display a screen of options (as shown below), such as **Stop/Resume** forwarding or **Pause/Cancel**.

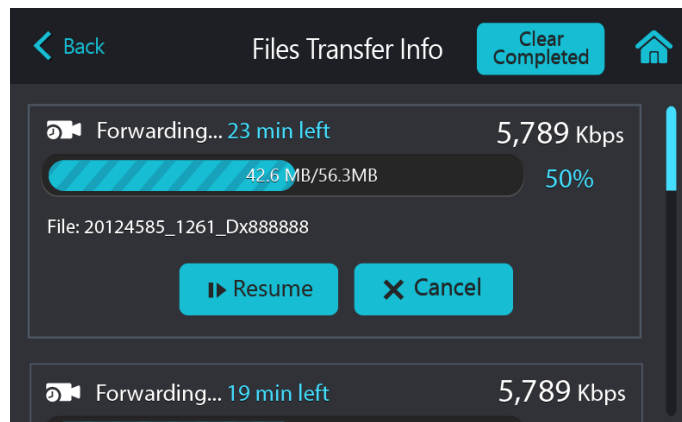


Figure 68: Options during an S&F Session

The **Pause/Cancel** options are disabled for S&F sessions that are still in progress.

Resuming

If for any reason the LU600 and the LU2000 are disconnected for under three minutes, then the LU600 will automatically resume forwarding the file once reconnected.

If, however, there is a loss of connection for more than three minutes, then the only way to resume transmission is to use the **Resume** button.

Monitoring – FILES Screen

The FILES screen displays a File Explorer that shows the content of the LU600's storage devices.

To display the FILES on the LU600 unit:

- 1 Tap the **FILES** button at the bottom of the Home screen. The following displays showing three types of storage containers – **Internal Storage**, **SD card** and **USB drive**.

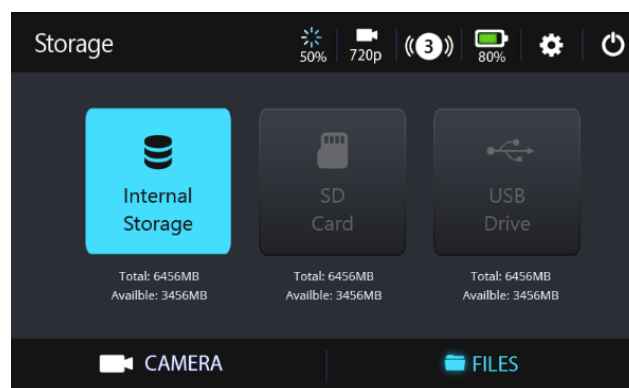


Figure 69: Storage Containers

Internal Storage

Displays a list of the files that were being forwarded by the Store & Forward option, but that did not complete for some reason. Files for which the Store & Forward operation is still in progress are also shown. These files are not deleted from the LU600 unit's storage until the upload has been completed and verified.

USB Drive

Displays a list of files on the USB drive. This option is only active when a USB drive is inserted in the LU600.

SD Card

Displays a list of the files on the LU600's micro SD card. This option is only active when a micro SD card is inserted in the LU600.

Tap one of the storage containers (Internal Storage, SD card and USB drive) to display the list of folders/files that it contains. For example, as shown below:

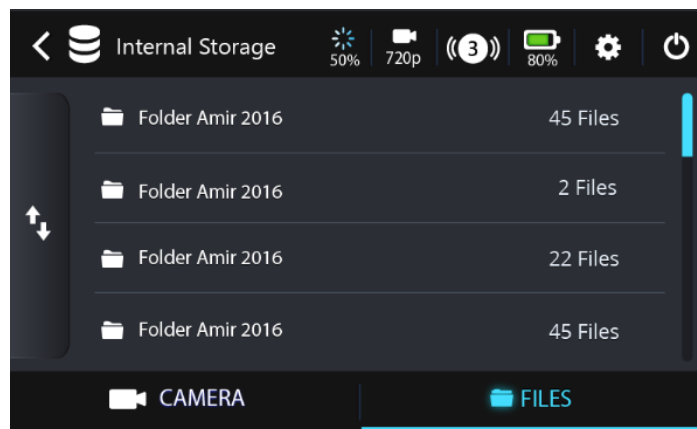


Figure 70: Folders List

You can browse the S&F folder to see which files remain in the queue and to restart the transmission of any files that were not fully transferred.

6 File Transfer (FTP)

This chapter describes how to use the LU600 to transfer files from the field directly to a Multi-Media Hub running on an LU2000 server.

Introduction

The LU600 enables you to transfer stored files to an LU2000. This feature can also be used to transfer any other type of file, such as text files, documents and so on.

Please note that from version 7.5.1 onwards, File Transfer may also be initiated and controlled remotely via LiveU Central.

Files can be transferred from the LU600 unit's micro SD card or from a USB flash drive.

NOTE

The LU600 has internal storage of 16 GB that can be used for Store & Forward sessions. You can also insert an SD card that can be used for Store & Forward sessions as well.

The micro SD card capacity can be from 4GB to 2TB, and must be a Class 10/UHS-I SD card from an established manufacturer.

When formatting external media please note that the LU600 unit supports the following file systems: FAT32, NTFS, exFAT and ext3/ext4. Also note that FAT32 supports a file size of up to 4 GB and therefore is not recommended.

At the receiving end, files are stored on the LU2000 in the directory designated for this purpose and are organized in folders according to the LU600 unit that sent them. Please refer to the *Managing MMH Files* section in the *LiveU Central User Guide* for more information.

Transferring Files

- 1 Select the channel to which you want to transfer the files, as described in the *Selecting a Channel* section on page 26.
- 2 Make sure that the LU600 *Home* screen displays **START**.
- 3 If the file to be transferred is on a USB Flash drive, then connect it to the side USB port above the power connector on the LU600 unit or insert a micro SD card in the unit.



Figure 71: USB Port



Figure 72: LU600 Micro SD Card Slot

- 4 Tap the  **FILES** button at the bottom of the *Home* screen. The following screen displays:

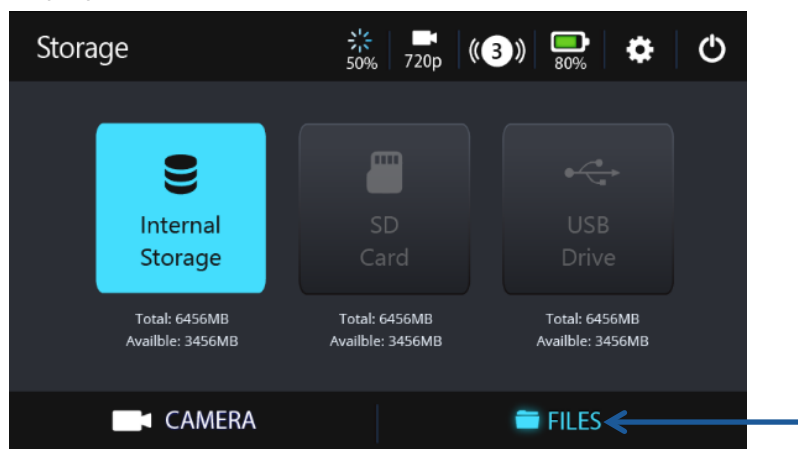


Figure 73: Storage Selection

This screen displays three types of file containers, as follows:

Internal Storage

Tap this icon to display a list of the files that were being forwarded by the Store & Forward option, but that did not complete for some reason. Files for which the Store & Forward operation is still in progress are also shown.

USB Drive

Tap this icon to display a list of files on the USB drive. This option is only active when a USB drive is inserted in the LU600.

SD Card

Tap this icon to display a list of the files on the LU600's micro SD card. This option is not active if the LU600 does not have a micro SD card inserted.

- 5 A browser screen displays. Select a file or folder in the list.

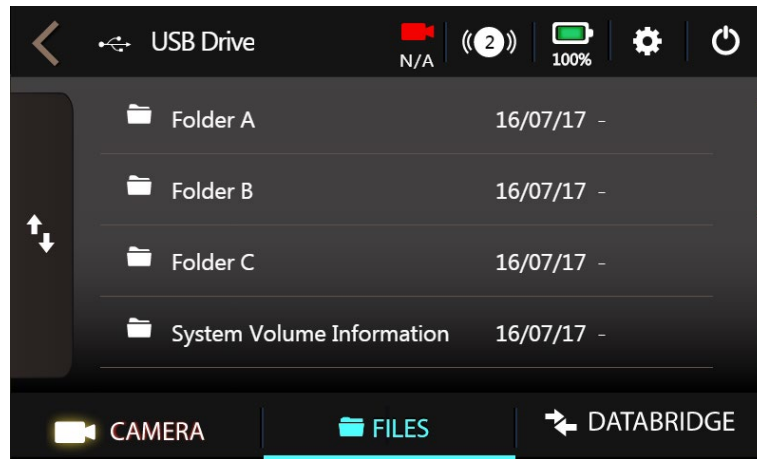


Figure 74: Folder Selection

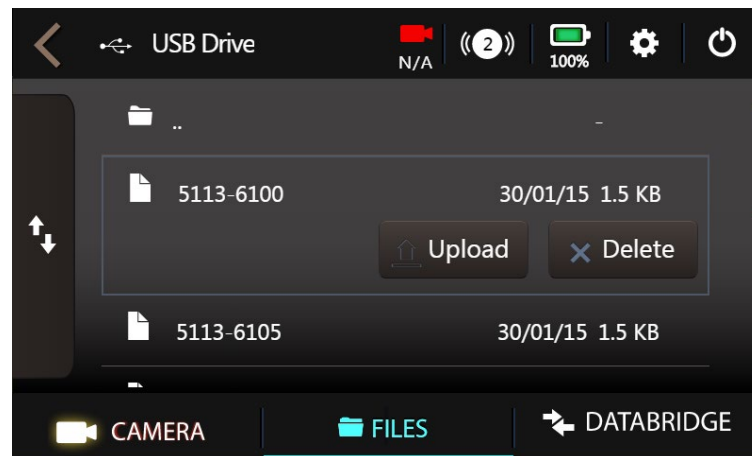
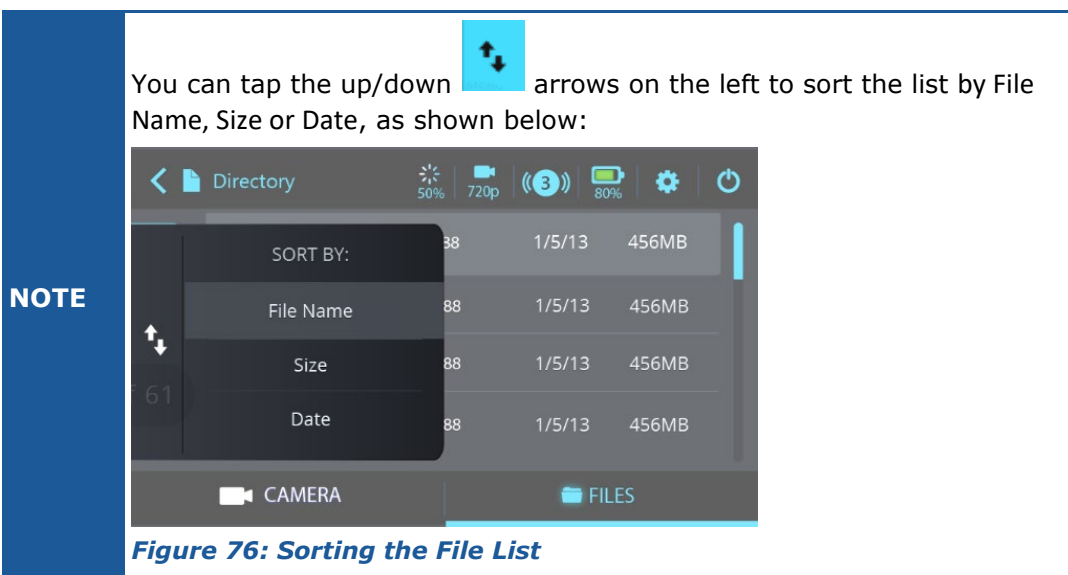


Figure 75: File Selection



- 6 Tap the **Upload** button to start sending this file to the LU2000 or the **Delete** button to delete this file.

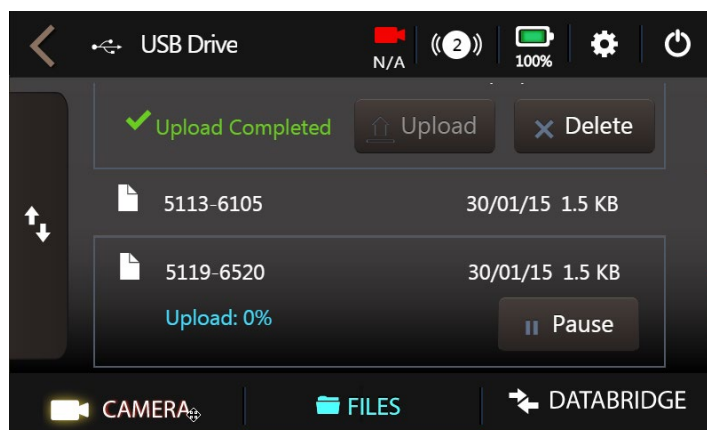


Figure 77: Uploading

To pause the file upload of a specific file during the transfer, tap the **Pause** button.

After the file was uploaded successfully, the file shows **Upload Completed**.

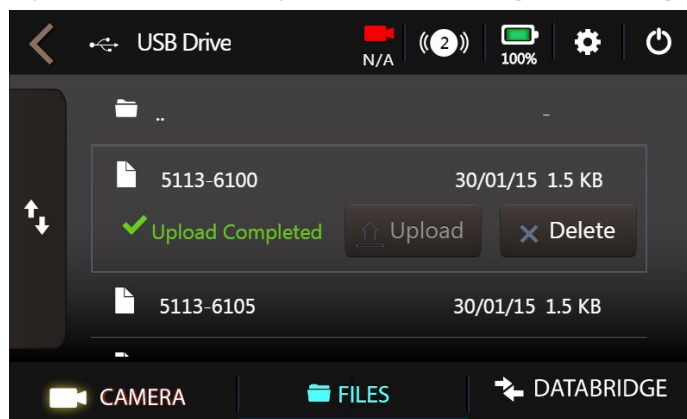


Figure 78: Upload Completed

File Upload Indication

When a file upload is running in the background (FTP or Store & Forward), the  indication displays on the *Home* screen. This icon shows the overall progress for all file transfers in the queue.

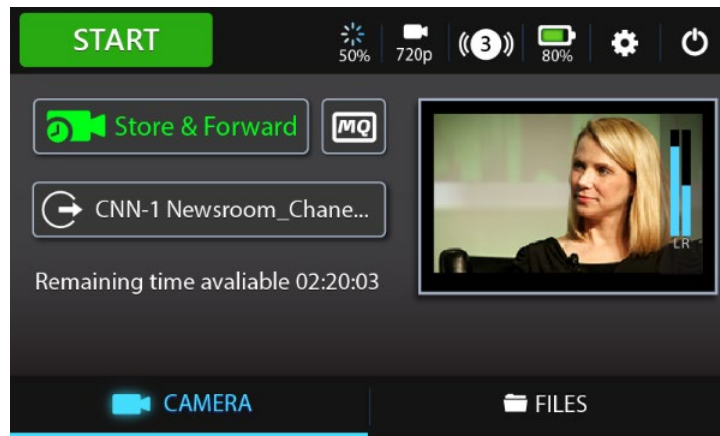


Figure 79: File Transfer Information – 1

Tapping this icon opens the following screen, which shows information about the uploaded files in the queue and their status, including the time remaining and the percentage remaining for the upload. Only one file is uploaded at a time. In order to clear the list of files that were uploaded successfully, tap the **Clear Completed** button.

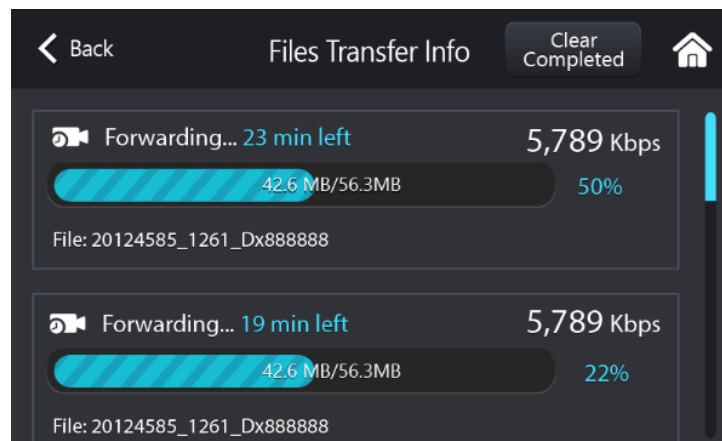


Figure 80: File Transfer Information – 2

7 Interrupted Feedback (IFB)

IFB Overview

The IFB feature provides a unidirectional audio channel from the LU2000 to LU600 unit operators in the field. This enables the personnel in the master control room (MCR) to broadcast verbal instructions or information about events to LU600 operators out in the field.

During broadcasting, LU600 operators can listen to an audio-only channel received from the IFB server using an earphone/headphone. IFB uses a unidirectional audio channel from the LU2000 to the LU600 unit, which allows the LU600 operator to listen, but not respond.

For more details about the IFB feature on the LU2000, see *Appendix A, Interrupted Feedback (IFB)* in the *LiveU LU2000 Server User Guide*.

IFB Setup

To set up IFB:

- Plug in the earphones/headphones into the microphone connector on the LU600. No other setup or configuration is required on the LU600.



During streaming, IFB has a ~700ms delay. Low delay mode is available in LiveU Central and supports delays as low as ~350ms.

Low delay IFB mode is slightly less resilient and is not supported when using IP satellite connections such as Ka/BGAN.

Please note that unless you have enabled the “IFB Always On” feature from within LiveU Central, you should make sure that the earphones were physically connected to the unit before starting to stream or the LU600 operator will not be able to hear anything on the IFB channel.

8 Video Return

Overview

The Video Return feature provides a unidirectional video channel from the Video Return Server (typically situated in the MCR) to LU600 unit operators in the field and is designed to send any video feed required back to the field. This is useful in a number of different live transmission scenarios, for example:

- Verification that the studio is receiving your live feed correctly, allowing for camera angle adjustment etc.
- Watching the live show while cueing up for a live interview
- Using the channel as a teleprompter to be displayed locally

This feature requires a Video Return Server to be installed and configured, and for that server to be connected to one or more sources of video intended to be streamed back to your LU600. For more information on installation of this feature, please contact LiveU support.

For more information on hardware installation and connectivity of the Video Return server, please see the LiveU Server User's Guide.

Operating Video Return on the LU600

Selecting Video Return

- 1 Tap the **VIDEO RETURN** option at the bottom of the *Home* screen (this option will only be visible if you have a Video Return server installed)

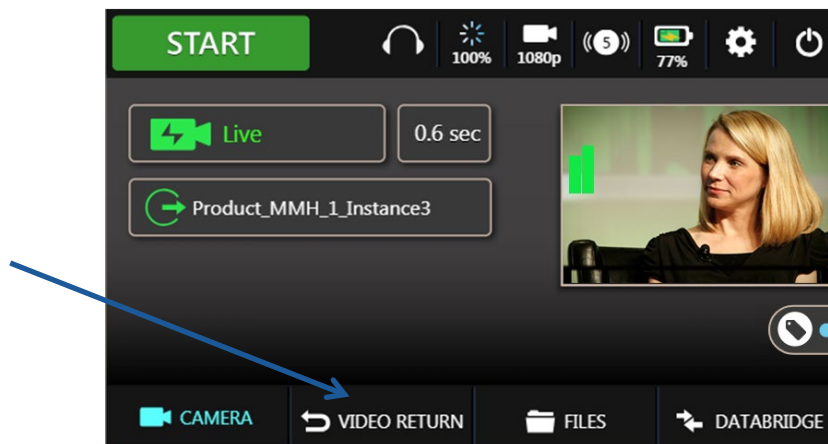


Figure 81: Video Return on the Home Screen

You will now be taken to the Video Return Screen where you can select a channel from the Video Return server and START / STOP incoming Video Return.

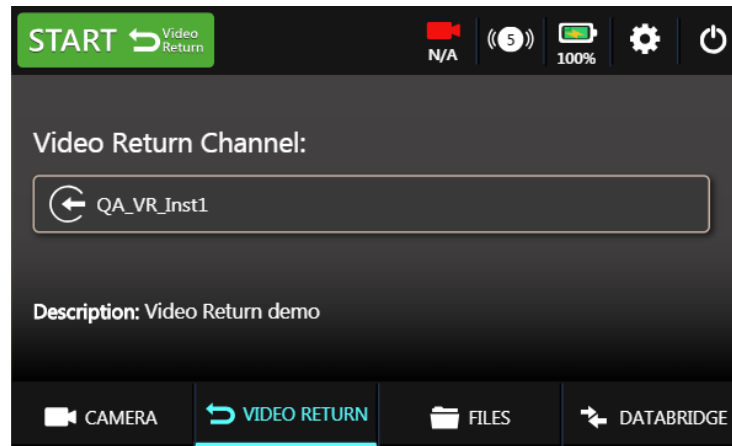


Figure 82: The Video Return Screen

Return Channel Selection

Tapping on the Video Return Channel name will open a list of currently available video channels (previously set up on the Video Return server). Select one of these channels by tapping on it. You can also use this screen to “favorite” a channel, using the same method as for standard MMH channels (see Marking a Channel as a Favorite on page 31)

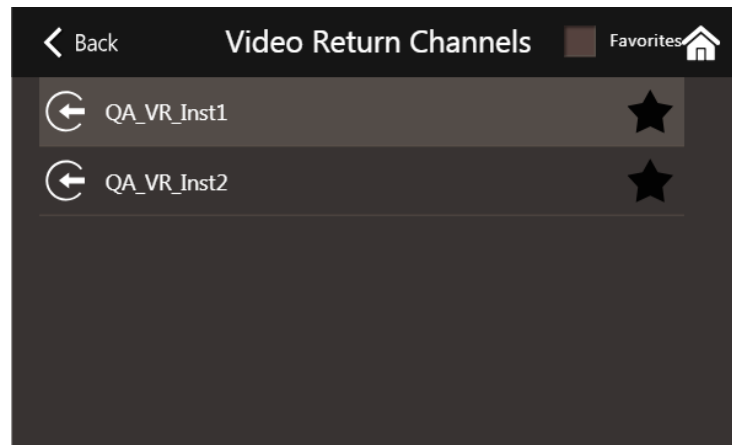


Figure 83: Video Return Channel Selection

Activating the Video Return stream

Tap on the green **START** button at the top of the screen. After a few seconds, the button will change to **STOP** and turn red.

Video Output

Once the Video Return channel is being shown on the local unit, you may view it on the LU600's built-in screen, listening to any accompanying audio by plugging headphones in the audio jack, or output the video and audio signals to an external HDMI monitor, using the supplied HDMI adapter cable plugged into the mini HDMI-out connector on the top of the unit.

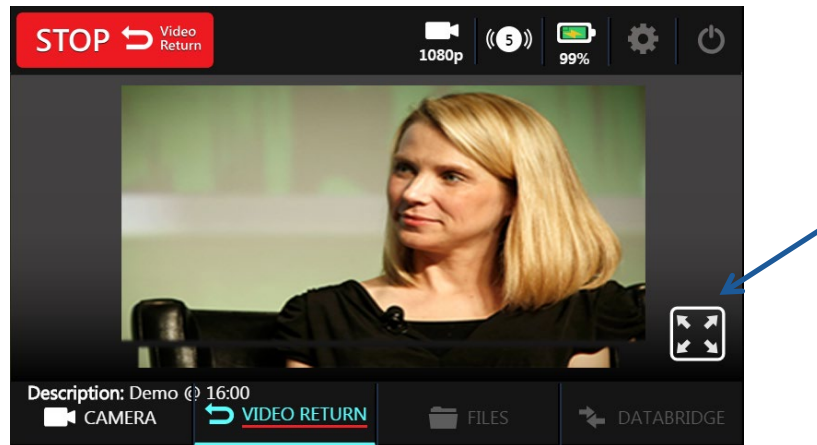


Figure 84: Video Return Display

You can also display the video full screen on the LU600, by tapping the crosshair icon. To exit full-screen mode, simply double-tap the video.

Going live while streaming a Video Return channel

Once you have a live Video Return channel displayed on your unit, you can return to the main LU600 screen by tapping the **CAMERA** button at the bottom left of the screen. You'll notice that even though you are on the Home screen, **VIDEO RETURN** is still active, shown by a red line under the text. You may now start your local live stream normally by clicking on the **START** button. Please note that you can start the local live stream before starting the Video Return screen, and visa versa.

9 DataBridge Operation

LiveU DataBridge Solution

LiveU's DataBridge service enables transmission and reception of any kind of data from diverse locations, while adapting to dynamic network conditions. This service can be used for a variety of data connectivity solutions, such as for connecting a laptop in the field to a control station.

The DataBridge provides WiFi hotspot or Ethernet-based internet access to any connected device such as laptops, phones, or tablets, providing a high capacity, resilient internet link, at up to 100Mbps.

The DataBridge is available as a dedicated hotspot unit based on the LU600 or as part of the LU600 and LU200 video uplink units; enabling users to work with the existing Video and File modes, or with one of the two DataBridge operational modes. The service supports 3 levels of connection: Cloud-based gateway, On-premise gateway, and direct connection (when working in **Multipath** mode only).

DataBridge Operational Modes

The DataBridge can be used in one of two different operational modes, **Multipath** and **Gateway**. These modes define connectivity and service strategies and are optimized to ensure the best connectivity with minimal delay across different internet scenarios.

Multipath

This is the default mode and should be used for more general internet applications such as browsing the Web, talking on Skype etc.

In **Multipath** operational mode, the DataBridge unit functions without any specialized Gateway and:

- Dynamically assigns any available network connection to the incoming requested service
- Can potentially provide higher throughput per service

Gateway

Use this mode when most of your traffic is planned for IP Video applications, when you intend working with a VPN service or want to use standard FTP applications.

In **Gateway** operational mode, the DataBridge unit requires a corresponding DataBridge Gateway and:

- Employs proprietary algorithms to simultaneously break down and transmit data over multiple modems and to bond the data received over its multiple modems.

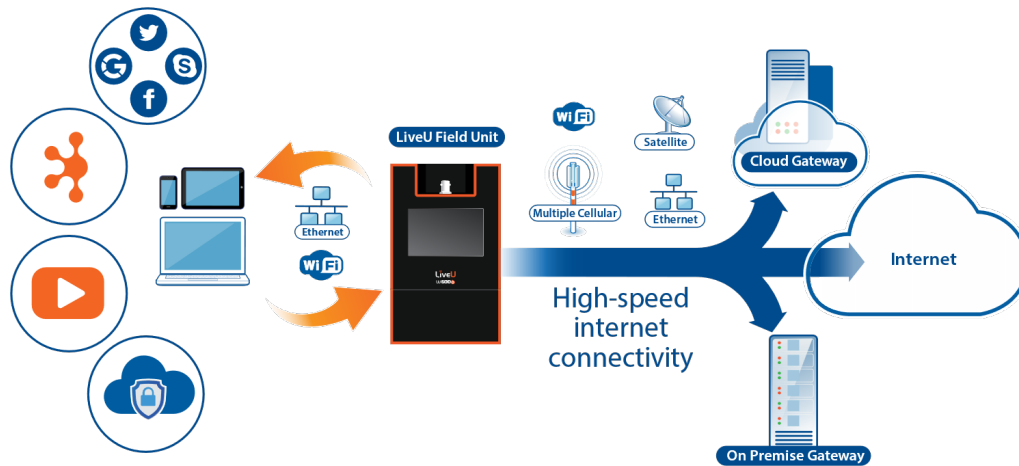


Figure 85: DataBridge Solution Architecture

DataBridge Gateway

When working with the **Gateway** operational mode, the unit will connect to a Cloud-based or On-Premise DataBridge Gateway server, which receives various streams of data from the DataBridge unit through its Internet network connections. The DataBridge Gateway server runs multiple remote connection instances. Each remote connection instance recombines the streams received from a specific DataBridge unit into a discrete data stream. The DataBridge on-premise server can serve up to 5 DataBridge units simultaneously.

DataBridge Mode

NOTE

Please note that DataBridge mode will only be available on a specific LU600 unit that has the DataBridge service enabled by LiveU Support.

The LU600 unit should be switched from Video mode to DataBridge mode in order to operate as a DataBridge. The LU600 will continue to operate in DataBridge mode until it is switched back to Video mode. Switching modes between Video and DataBridge does not require a unit reboot.

To switch to DataBridge mode:

- 1 Tap the **DataBridge** option at the bottom of the *Home* screen. This option is only available if you already have DataBridge service.

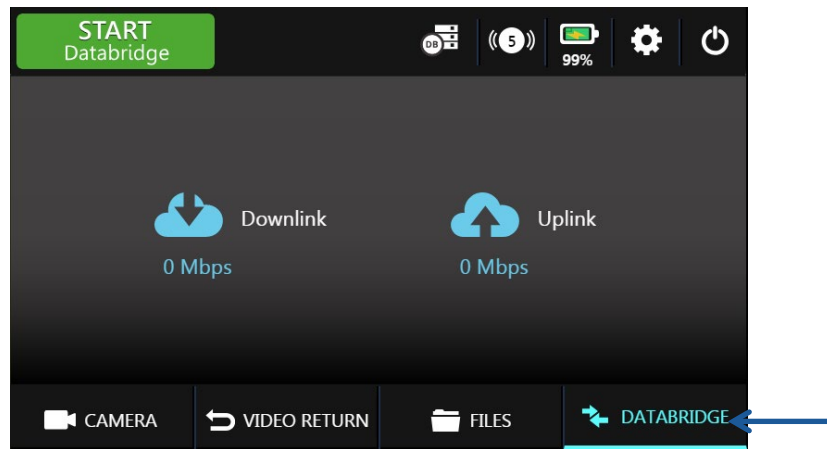


Figure 86: DataBridge

Operating in DataBridge Mode

For the LU600 to operate as a DataBridge in **Gateway** operational mode, the unit must be associated to a DataBridge Gateway instance in LiveU Central. To make sure that the Gateway has been correctly set up, please contact LiveU Support and request that a DataBridge Gateway instance be assigned to the LU600 unit for this purpose.

When using **Multipath** operational mode, there is no need to worry about having a DataBridge Gateway available.

To start operating in DataBridge mode

- 1 Tap **START Databridge** to connect to the DataBridge. The unit will automatically connect to the gateway (if in **Gateway** operational mode) and the **START** button changes to **STOP**, as shown below:

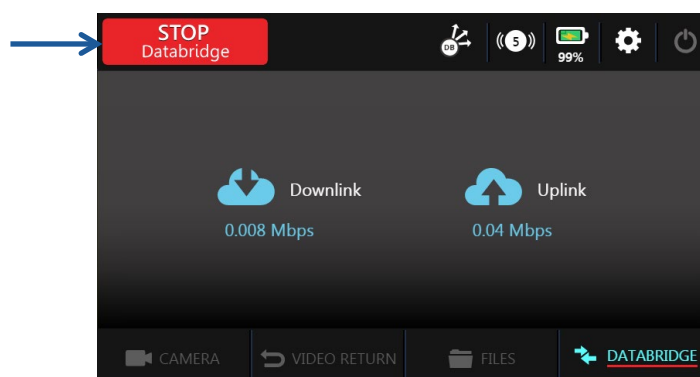


Figure 87: LU600 After Connecting to the DataBridge Gateway

Once connected, the DataBridge *Home* screen will display the current downlink/uplink rate. Pressing the **Connections** button at the top of the screen opens the *Connections* screen and shows the specific bitrate used per interface.

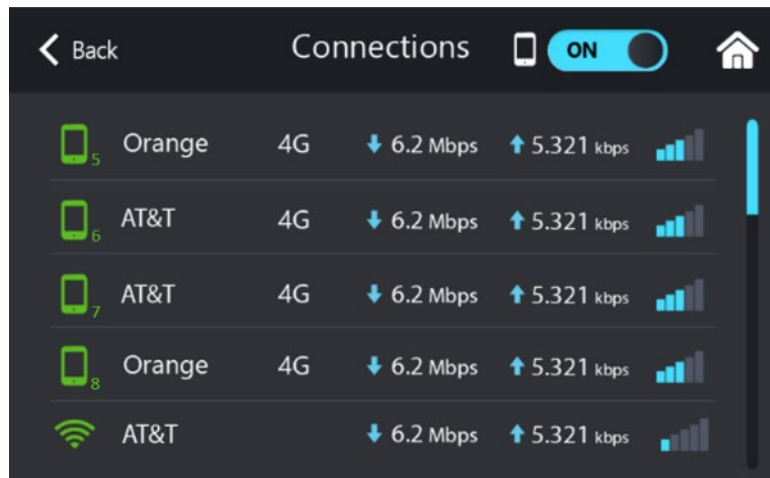


Figure 88: Connections List in DataBridge Mode

When you are ready to disconnect from the gateway, tap the **STOP DataBridge** button.

DataBridge Settings

You can use the DataBridge settings screen to configure the DataBridge operational mode as well as the WiFi Hotspot settings.

Tap the **Advanced Configuration**  button in the Home screen and select the DataBridge item.

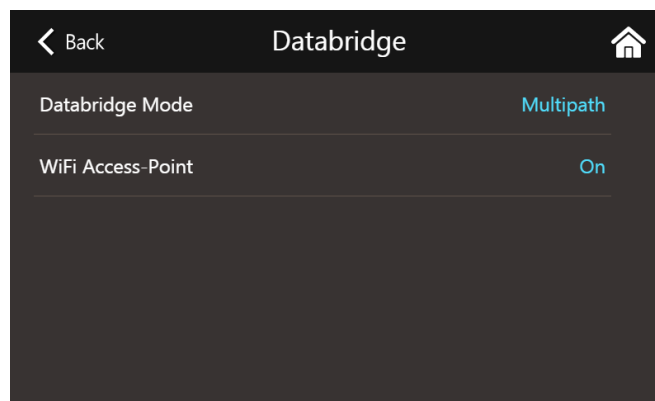


Figure 89: DataBridge Settings Screen

Selecting DataBridge Operational Modes

Tap on the DataBridge Mode menu item in the DataBridge setting screen and select the mode required (either **Multipath**, or **Gateway**).

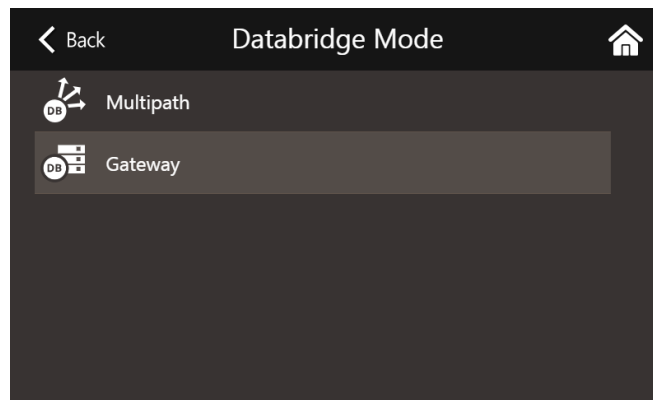


Figure 90: DataBridge Operational Mode Screen

Configuring DataBridge WiFi Hotspot Parameters

To configure DataBridge WiFi Hotspot Parameters, tap the **Advanced Configuration**  button in the Home screen, and select the DataBridge Settings Screen. Now tap on the WiFi Access-point menu item.

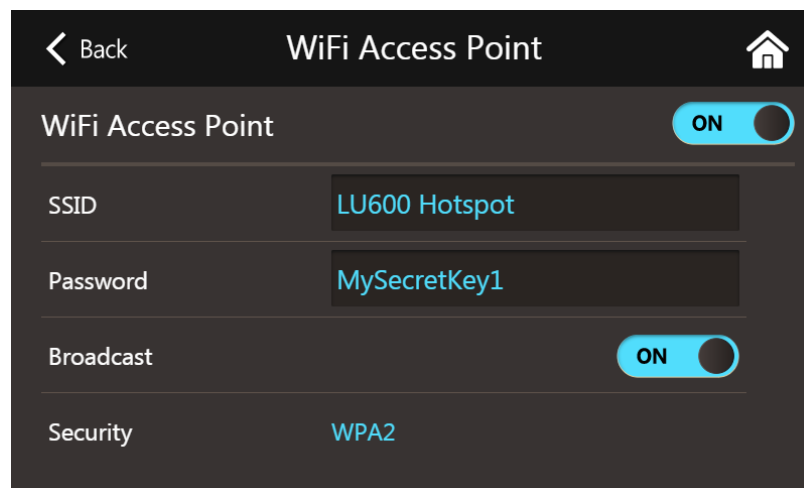


Figure 91: DataBridge Hotspot Screen (part 1)

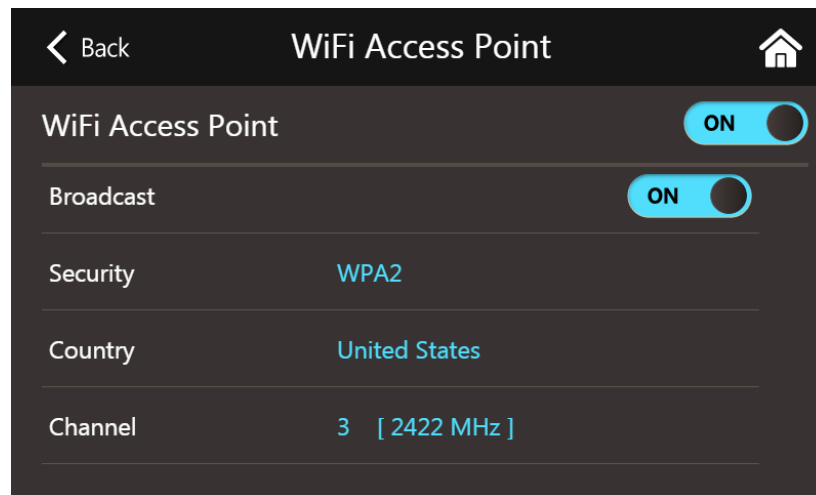


Figure 92: DataBridge Hotspot Screen (part 2)

Turning the Hotspot On / Off

To turn the Hotspot feature on or off, simply slide the ON/OFF switch that appears at the top of the screen labelled WiFi Access Point. The access point will only be activated once the DataBridge has been started (see page 69).

Setting the SSID (station ID)

Type in the name of the Hotspot WiFi station that will appear on any clients list of WiFi stations when performing a WiFi scan.

Setting the WiFi Hotspot Password

Enter the password for accessing the Hotspot WiFi station. Note that the password needs to be at least 8 characters long (as required for WPA2 keys). If you enter a password shorter than this, the field will be highlighted in red and your entry won't be accepted.

Toggling Hotspot Station Broadcast Status

You can tell the LU600 to open the Hotspot, yet not broadcast its SSID by toggling the ON/OFF switch next to **Broadcast**. When set to **OFF**, the WiFi hotspot will be active however any clients that wish to connect to it will need to explicitly configure their WiFi to find and connect. Note that clients that have already connected to this SSID / password combination in the past, should be able to connect automatically.

Setting WiFi Hotspot Security

Use the **Security** field setting to choose either WPA2 security or no security for this Hotspot. WPA2 is the recommended setting for this field.

Setting Country

Set the country where the LU600 hotspot is being used in order to configure the Hotspot with supported frequencies / channels. Tap on the **Country** field to select your country from a list.

Setting WiFi Channel

Tapping on the Channel field will allow you set the WiFi channel that hotspot will use. Change the existing channel if you experience poor reception of the hotspot, which may happen when other (more powerful) stations are broadcasting on the same channel.

10 Working with Metadata on the LU600

This chapter describes how Metadata is treated within the LiveU ecosystem, and more specifically, how to set up your LU600 to support correct metadata transfer from field to studio. For more information on how Metadata is handled by LiveU Central, please refer to appropriate chapter in the LiveU Central User Guide.

Metadata Overview

LiveU supports the IPCT's NewsML-G2 format for Metadata, from the field unit through to the MMH. From the IPCT's website: "NewsML-G2 is the cost-effective way of managing news, whether for a news provider, web site, news aggregator, newspaper or television station". When properly integrated, NRCS (News Room Control Systems) like ENPS and iNews can use this XML Metadata as part of their workflow.

With Metadata enabled on the LU600, every Live session, Store & Forward session, or file transfer is accompanied by an XML file that contains information pertinent to the session. This XML file consists of static (locally or remotely edited fields) data, and dynamic (time, location, video format etc.) data. The XML file is sent from the LU600 as part of the session and is saved for later referral and use on the MMH.

Metadata operation on the LU600

The LU600 contains interface elements that support LiveU's implementation of Metadata as described above.

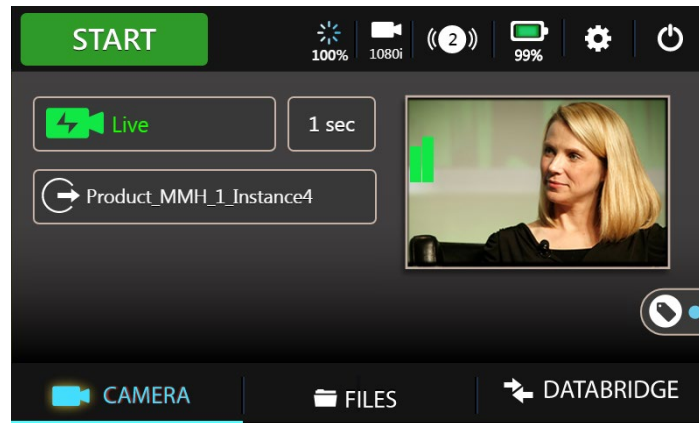


Figure 93: LU600 Home Screen w/Metadata Enabled

Turning Metadata On or Off

You may access the Metadata tab by tapping on the Metadata icon  that appears on the home screen.

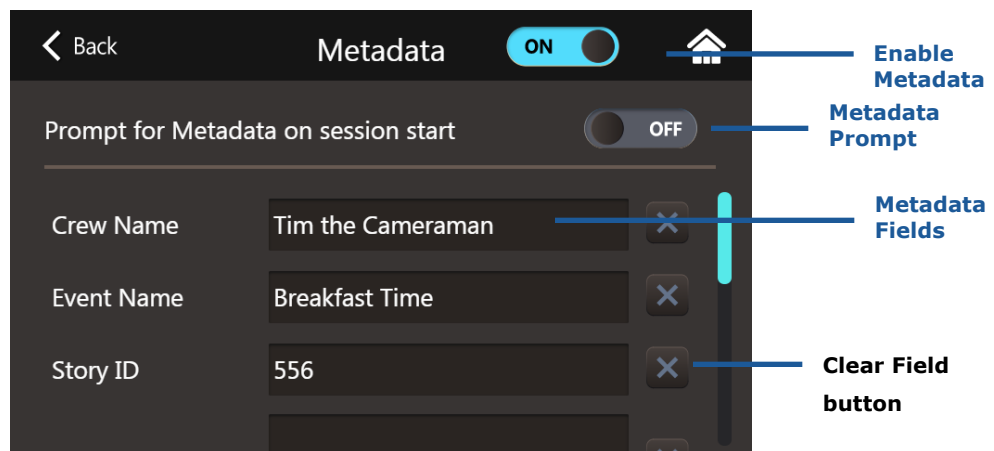


Figure 94: The Metadata Tab

To include Metadata in your transmissions, turn Metadata on by tapping on the top switch, moving it to the ON position. Each transmission will now be accompanied by its own XML file. Whenever Metadata is enabled, the Metadata Active indicator in the Metadata icon on the home screen will be "lit".

Turning Metadata Prompts On or Off

The LU600 can remind you to set Metadata fields whenever you wish to go live or start a Store & Forward session. To set the Metadata Prompt, tap on the "Prompt for Metadata on session start" button at the top of the screen as shown above.

From this point on, whenever you press the START button to go live, the unit will pause, showing you the Metadata Prompt window. To go live using the current field values, tap on the **Start** button. If you wish, you can also change any of the fields' values, and when ready, tap the **Start** button. To cancel the transmission, just tap the **Cancel** button.

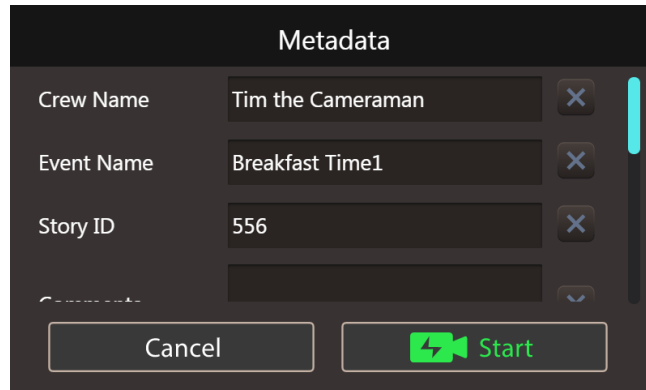


Figure 95: The Metadata Prompt Window

Metadata Field Entry

To change Metadata field values, simply tap on the field you wish to change and use the built-in keyboard to enter your data. To clear the current value of any field, tap on the X next to the field.

Please note that field values are constantly synchronized with LiveU Central and may be changed by the LiveU Central operator at any time.

11 Using the Wired Remote Control

This chapter describes how to use the wired remote control provided with the LU600 backpack.

LU600 Wired Remote Control

The LU600 backpack includes a wired remote control designed to turn on/off the unit and start/stop live streaming without using the unit's GUI.

This remote also indicates the unit's status while the unit is being worn by a cameraman.



Figure 96: LU600 Remote Control – Unit is Turned Off

Connecting the Remote to the Unit

The wired remote control should be connected to the USB port located above the DC power input. For additional utility, the remote control includes a USB port, which can be used to connect an additional modem or USB memory stick for uploading files.



Figure 97: LU600 Wired Remote Control

NOTE

The wired remote control is designed to work only with the LU600. Plugging it into other LiveU products or any other device (such as a PC) may cause damage to the device and/or the remote.

Turning the Unit On/Off

Turning the Unit On

While the unit is turned off, press the remote button for one to two seconds. After the unit is turned on, the status LED indication switches to red.



Figure 98: LU600 is Turned On, But Not Ready to Stream

When the unit is powered up, connected to the internet and a valid video input is detected, the status LED will turn green, indicating that the unit is ready to stream.



Figure 99: LU600 is Turned On and is Ready to Stream

Turning Off the Unit

To turn off the unit, long press the remote button, as follows:

- **Software Reset (Recommended):** Press and hold the remote button for approximately four seconds. After the status LED starts to blink, the unit starts its shutdown process, which can take approximately 15 seconds to complete. After the unit shuts down, the status LED turns off.
- **Hard Reset:** Press and hold the remote button for approximately eight seconds. Both the unit and the status LED immediately turn off.

Starting/Stopping Live/Store & Forward Streaming

Starting Streaming

Short press the remote button while the unit is ready for streaming (meaning that the remote status LED is green) to start streaming. The Live LED blinks for around five seconds during the connecting phase. After the unit is streaming, both the status and the Live LEDs are green.



Figure 100: LU600 is Streaming

Stopping Streaming

Quickly double-press the remote button to stop streaming (this method is designed to prevent sporadic stop-streaming events). Once the unit stops streaming, the Live LED turns off and the status LED remains illuminated.

12 Handling the LU600

This chapter describes how to perform various tasks for handling the LU600, such as replacing the battery, inserting SIM cards and so on.

This chapter contains the following sections:

- **Inserting a Module SIM Card**, page 81
- **Dual-SIM Module Installation**, page 84
- **Connecting an Extra (9th) Modem/Module**, page 84
- **Attaching and Replacing a Battery**, page 86
- **Ethernet Connection**, page 88
- **Connecting to the Xtender**, page 88

Inserting a Module SIM Card

The LU600 is provided with communication modules already inserted. These modules may already have SIM cards inserted into them. If so, then you can skip reading this section.

NOTE

After inserting a module and/or SIM card, the LU600 will automatically discover the operator's name and the Access Point Number (APN), and display them in the *Interfaces* screen within 15 to 30 seconds. If necessary the APN can also be configured remotely via LiveU Central.

NOTE

This procedure should also be performed when inserting or replacing a SIM card.

To insert module SIM cards:

- 1 Remove the thumbscrew on the back of the unit.



Figure 101: Releasing the Cover

- 2 Gently pull the cover of the LU600 upwards and off, as shown below:



Figure 102: Removing the LU600 Cover to Expose the Modules

The following shows the eight ports in which a module is placed:



Figure 103: Module Positions

The four internal slots from left to right are numbered, **4, 3, 2** and **1**. The four external slots from left to right are numbered **8, 7, 6**, and **5**.

NOTES

Modules can be inserted into the ports in any order. We recommend using all eight ports, but it is not mandatory.

For easy recognition, modules are clearly marked to indicate whether they are for 3G or 4G.

- 3** Insert the SIM card into the module. The module does not need to be removed in order to insert the SIM card. The figures below show the correct way to insert the SIM card.



Figure 104: Inserting a SIM Card into a Module – 1

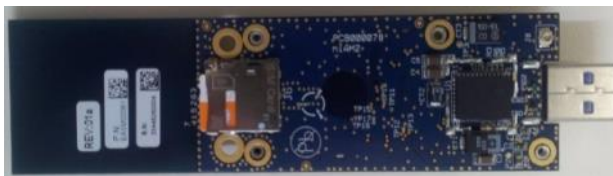


Figure 105: Inserting a SIM Card into a Module – 2

- 4** Replace the cover of the LU600, remembering to replace and tighten the thumbscrew.

Dual-SIM Module Installation

Your LU600 unit may have been supplied with Dual-SIM modules. These modules allow you to install 2 sets of SIMs (A and B), where the LU600 GUI provides the option to switch between these SIMs on a specific module or on all modules at once.

Why Use Dual-SIM Modules

These modules turn any LU600 into a dual-purpose local / roaming unit, and support a number of real life situations, for example:

- Roaming: install a local SIM in one slot, and a roaming SIM in the other
- Pre-Paid Extension: in certain scenarios where it would be more practical to switch an expended pre-paid SIM with a fresh one

Installing SIMs in a Dual-SIM Module

Each Dual-SIM module has 3 SIM slots: the top slot (called "**A**") and two lower slots (called "**B1**" and "**B2**"). The two B slots are interchangeable and provide convenient access to the SIM, regardless of the orientation of the module when installed in the LU600.

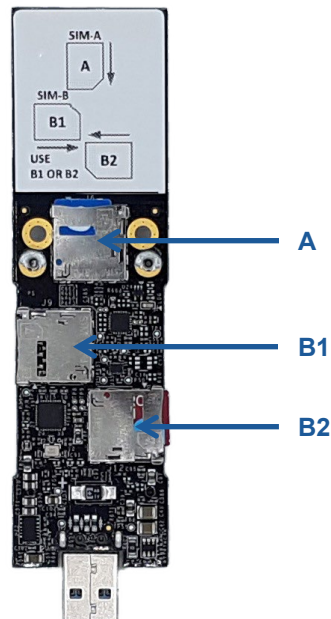


Figure 106: Dual-SIM Module

Choose a SIM to install in slot **A** (depending on your preference, it could be a local SIM, a roaming SIM, or even a pre-paid SIM). Now choose another SIM to install in either **B1**, or **B2**. Do NOT install a SIM card in both of the B slots.

Once the module has been installed in the LU600, the unit will detect the Dual-SIM automatically and you should be able to use the GUI to switch the active SIM slot accordingly as detailed in Dual-SIM Modules – GUI Additions on page 37.

Connecting an Extra (9th) Modem

The LU600 has the option to add an additional (9th) modem. This additional modem will be automatically dialed and combined into the consolidated broadband uplink connection in the same way as the other modems installed inside the LU600 chassis.

Connect the additional modem to the side USB port above the power connector on the LU600.



Figure 107: USB Port

This additional modem appears in the list in the *Connections* screen.

Attaching and Replacing a Battery

The LU600 is provided with a standard battery. The following picture shows the battery when not connected to the LU600.



Figure 108: LU600 Battery

NOTE

The LU600 can also be ordered with a special connector for mounting on a camera. There are two types of connectors used for this purpose: one with an Anton Bauer battery and one with a V-mount battery. If your LU600 has this special camera connector, then the Anton Bauer/V-mount battery charges both the LU600 and the camera. Another separate battery is not needed to charge the LU600.

To attach the battery:

- 1 Use both hands to press the two battery latch buttons on the left and right sides of the battery.
- 2 Position the body of the LU600 over the battery by matching the pegs on the unit to the slots on the battery.
- 3 Slide the LU600 body into place until you hear it snap into the battery.

To replace the battery:

- 1 Press the battery release button on the battery, as shown below:



Figure 109: Releasing the Battery

- 2 Slide the body of the LU600 towards you and gently lift the LU600 body up and away from the battery.
- 3 Position the body of the LU600 so that it is hovering slightly above the replacement battery.
- 4 Use both hands to press the two battery latch buttons on the left and right sides of the battery and snap the LU600 body onto the battery. You should hear a click when it is in place.

Ethernet Connection

The LU600 contains a DHCP client. Two Ethernet ports are available.

To connect the LU600 to an Ethernet network:

- On the back of the LU600, plug in the Ethernet cable into one of the two available Ethernet slots.



Figure 110: Ethernet Connections

Connecting to the LiveU Xtender

The LiveU Xtender can be connected to the LU600 either by an Ethernet cable or with a remote wireless kit (sold separately as an accessory).

For more details about the Xtender and connecting the Xtender to the LU600, see the *LiveU Xtender User Guide*.

Connecting the LU600 WiFi Client Pouch to the Backpack

The WiFi Client for the LU600 has one connector – the LAN connector (LAN CBL00218), which connects to the LAN port on the LU600 device. This connector provides both communication and power.

To connect the LU600 WiFi Client pouch to the backpack:

- 1 Lie the backpack on a flat surface and unzip its bottom compartment.



Figure 111: Unzipping the Bottom Compartment

- 2 Pull the bottom compartment apart to expand it.



Figure 112: Expanding the Bottom Compartment

- 3 Unzip the compartment's zipper to expand the compartment.



Figure 113: Unzipping the Compartment's Zipper

- 4 Position the pouch so that the cables are on the right, as shown below:



Figure 114: Turning the Pouch

- 5 Thread the LAN cable through the plastic opening on the side of the backpack, as shown below:



Figure 115: Threading the LAN Cable

- 6 Push the cable from the inside of the backpack through the designated hole into the bottom of the inside of the backpack in order to connect to the LU600.



Figure 116: Pushing the Cable Through the Hole in the Backpack

- 7 Put the LU600 device into the backpack and connect this cable to its LAN port 2, as shown below:



Figure 117 Connecting the Cable to the LAN Port

- 8 Close the bottom compartment's zipper.
- 9 Open the two Velcro straps on the top of the pouch and the two Velcro straps on the bottom of the pouch.



Figure 118: Opening the Straps

- 10 Place the pouch on top of the bottom of the backpack and thread the top Velcro straps of the pouch through the two top plastic loops on the backpack.



Figure 119: Placing the Pouch on the Backpack

- 11 Press the top two Velcro straps down to secure the top part of the pouch to the backpack.



Figure 120: Securing the Top Velcro Straps of the Pouch to the Backpack

- 12 Press the bottom two Velcro straps down to secure the bottom part of the pouch to the backpack.



Figure 121: Securing the Bottom Velcro Straps of the Pouch to the Backpack

13 FAQs

This chapter answers various frequently asked questions about the LU600.

1 Does the LU600 come with SIM cards installed?

This depends on whether the LU600 was purchased (is provided without SIM cards) or leased (is provided with SIM cards).

2 Where are SIM cards placed?

Open the back cover of the LU600 and insert the SIM cards, as described in the *Inserting a Module SIM Card* section on page 81.

3 How do I know which SIM cards are supported in my country?

Browse to the following link to see a list of the operators in your country. All operators listed under GSM should work with the modems provided in the LU600.

http://en.wikipedia.org/wiki/Mobile_Network_Code

Contact a LiveU support representative if you need additional assistance.

4 What is the next step after inserting the SIM cards into the LU600 unit?

The following options are available for configuring the Access Point Number (APN):

- By default, the LU600 automatically configures the correct APN.
- If the system fails to automatically configure the APN, then you may refer to the *LiveU Central User Guide* for a description of how to configure the APN.

5 How do I know whether or not the LU600 unit is connected to the Internet?

You have the following options:

- **Connections Screen:** Check whether any of the interfaces (modems or Ethernet) are connected in the *Connections* screen (see 33). Connected interfaces display a green indicator.
- Check that the unit is not offline.

6 The LU600 unit does not connect to the Internet. What is the problem?

- There is no cellular reception.
- There are no SIM cards inserted in the LU600 unit.
- The SIM cards are not activated or do not support the data plan.
- Modems are not plugged in properly into the USB ports inside the LU600 unit.
- The APN is not configured correctly on the modems.

7 What is the purpose of the micro SD slot?

The micro SD slot can be used for the **Store & Forward** option (described on page 50) and the **File Transfer** option (described on page 58).

8 Which modules can be used in the LU600?

Verify which modules can be used with your LiveU support representative.

9 In which countries does the LU600 work?

All over the world!

10 How do I get support for the LU600?

You may refer to the *Support and Contacting Information* section on page 11 for more information.

11 Can I stream directly to the web? How?

Yes, this package can be purchased from LiveU sales. You may refer to the *Support and Contacting Information* section on page 11 for more information.

12 How many hours does the battery last?

The LU600 battery lasts for three to four hours depending on the amount of unit activity.

13 Why can I not hear using the earphones/headphones?

For the IFB feature to work properly, earphones/headphones must be connected before the streaming starts, or the IFB Always On function should be enabled in LiveU Central. For more details, see the *IFB Setup* section on page 63.

In addition, the IFB feature must be properly configured on the LU2000 server. For more details, see *Appendix A, Interrupted Feedback (IFB)* in the *LiveU LU2000 Server User Guide*.

14 Can I stream to multiple channels (LU2000s) at the same time?

LiveU's MultiPoint cloud-based IP video distribution service enables video from the field to be streamed from office to office or from an LU600 unit to multiple offices. In the MultiPoint service, video can be streamed from one LU2000 server and distributed to one or more other LU2000 servers. This feature requires a licensed LiveU add-on.

15 Which camera resolutions are supported?

The LU600 supports the following camera input resolutions:

- 1080p50/60/25/30/24
- 1080i50/60
- 1080i59.94
- 720p50/60/25/30/24
- SD NTSC 720x480
- SD PAL 720x576

A Safety and Maintenance

This appendix describes how to maintain the LU600 and how to handle potential hazards.

Safety Information

CAUTION

Do not disassemble this product. Do not remove its cover or its back. There are no user-serviceable parts inside. Refer servicing to qualified service personnel only. The use of controls, adjustments or procedures other than those specified in the guide may result in exposure to shock and/or electrical or mechanical hazards.

The LU600 is supplied with a replaceable battery. As such, you should treat the unit accordingly:

- Avoid shorting the battery.
- Do not immerse the unit or the battery in water.
- Do not disassemble or deform the battery.
- Do not expose the unit to fire and do not dispose of the unit and its battery in fire.
- Avoid excessive physical shock or vibration of the unit.
- Never use a unit that contains a battery that appears to have suffered abuse.

- Store the LU600 in an environment with low humidity that is free from corrosive gas, and in temperatures from -20°C to 60°C, < 80% RH.
- Only use the originally approved power supply adapter.
- Only use the supplied accessories. Accessories (including cables) must not be replaced.
- Do not use the product if there is any physical damage to the enclosure.
- Keep all air inlets and outlets free of any objects that may interfere with the air flow for at least 10 cm.
- It is normal for the product to become slightly hot during use. However, if the enclosure's temperature becomes unbearable to touch, turn the product off and contact support.
- Avoid leaving the product unprotected in direct sunlight for more than five minutes.
- Do not let the product come into contact with corrosive materials.
- Do not let the product come into contact with explosive or corrosive gas.

- Do not let the product come into contact with fire.
- To prevent fire or shock hazard, do not expose the product to rain, liquid or moisture. The product can be used in light rain while it is protected by the LU600 backpack and using the attached rain hood. The product is not designed to be used under water.
- Only use the original LiveU backpack. Do not place the product in a non-LiveU bag.
- If the LCD screen breaks for any reason, do not touch the glass.

Potential Hazards

The LU600 unit contains cellular devices that should be operated according to the same rules and limitations as expected from normal cellular devices. Do not operate the LU600 in an environment that may be susceptible to radio interference resulting in danger, specifically:

- **Areas where prohibited by the law**

Follow any special rules and regulations and obey all signs and notices. Always ensure that the enclosure is turned off (the power switch is not lit) when instructed to do so, or whenever it may cause interference or danger.

- **Where explosive atmospheres may be present**

Do not operate the LU600 in any area where a potentially explosive atmosphere may exist. Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death. Be aware and comply with all signs and instructions.

- **It is not advisable to operate the LU600 while at a refueling point or service station**

Users are reminded to observe restrictions on the use of radio equipment in fuel depots (fuel storage and distribution areas), chemical plants or where blasting operations are in progress.

- **Areas with a potentially explosive atmosphere are often, but not always, clearly marked**

Potential locations can include gas stations, below deck on boats, chemical transfer or storage facilities, vehicles using liquefied petroleum gas (such as propane or butane), areas where the air contains chemicals or particles, such as grain, dust or metal powders, and any other area where it would normally be advisable to turn off a vehicle's engine.

- **Near medical and life support equipment**

Do not operate the LU600 in any area where medical equipment or life support equipment exist, or near any equipment that may be susceptible to any form of radio interference. In such areas, the host communications device must be turned off. The LU600 may transmit signals that could interfere with this equipment.

- **On an aircraft, either on the ground or airborne**

In addition to FAA requirements, many airline regulations state that wireless operations must be suspended before boarding an airplane. Please ensure that the LU600 is turned off prior to boarding aircraft in order to comply with these regulations. The enclosure can transmit signals that could interfere with various onboard systems and controls.

- **While operating a vehicle**

The driver or operator of any vehicle should not operate a wireless data device while in control of a vehicle. Doing so detracts the driver or operator's control and operation of that vehicle. In some countries, operating such communications devices while in control of a vehicle is an offense.

For more information, visit www.liveu.tv.

B Limitation of Liability and Warranty

This appendix describes the limitations on liability and warranty.

Limitation of Liability and Warranty

This LiveU product is provided “as is” without warranty of any kind. The company disclaims all other warranties, either express or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose and non-infringement.

Under no circumstances shall the company be liable for any damages whatsoever (including, without limitation, consequential, special, or incidental damages, or damages for loss of business profits, business interruptions, loss of business information or other pecuniary loss) arising out of the use of or inability to use the LiveU product, even if the company has been advised of the possibility of such damages.

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[HTTP://WWW.MPEGLA.COM](http://www.mpegla.com)

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[HTTP://WWW.MPEGLA.COM](http://www.mpegla.com)

Regulatory Compliance

This appendix provides regulatory compliance information including FCC compliance details.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules.

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

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

FCC ID:

- **Cellular Modems:** Sierra Wireless EM7455 - N7NEM7455, EM7565 - N7NEM75L, EM7511 - N7NEM75S
- **WiFi Module:** Azurwave AW-CM389NF - TLZ-CM389NF

Standards Compliance	
CE	
EMC	ETSI EN 301 489-1 V2.1.1 ETSI EN 301 489-7 V1.3.1 ETSI EN 301 489-17 V3.1.1
Safety	IEC/EN 60950-1 A2:2013 CB Scheme
Radio	EN 300 328 V2.1.1 EN 301893 V2.1.1 EN 301 908-2 V11.1.1 EN 301 908-13 V11.1.1
FCC/Canada	
EMC	FCC p15 subpart B ICES-003 Issue6 ClassB
Radio	FCC part15.247 FCC part15.407 FCC rules part 22H//24E/27/90 RSS-Gen

REINVENTING LIVE