LiveU LU2000 Server
User Guide

LiveU

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About This Guide

This manual describes the LiveU LU2000 and explains how to install it, as follows:

- **Chapter 1, Introducing the LU2000:** page 6. This chapter introduces the functionality of the LU2000 and describes its system architecture.
- **Chapter 2, Installing the LU2000:** page 12. This chapter describes how to install and set up the LU2000 so that it is ready for operation.
- **Appendix A, Interrupted Feedback (IFB):** page 26. This appendix describes the IFB feature and how to set it up. IFB provides a unidirectional audio channel from the LU2000 to device operators in the field.
- **Appendix B, Limitation of Liability and Warranty:** page 29. This appendix provides the limitations on liability and warranty.

Intended Audience

This manual is intended for users of the LiveU LU2000. The manual assumes that users have basic computer, IT and server knowledge. This manual also assumes that the reader is familiar with the video equipment and infrastructure to which the LU2000 connects.

Additional Documentation

- LiveU Central User Guide
- LiveU LU40 User Guide
- LiveU LU70 User Guide
- LiveU LU70L User Guide
- LiveU LU400 User Guide
- LiveU LU500 User Guide
- LiveU LU700SV User Guide
- LiveU LU-Lite Mac User Guide
- LiveU LU-Smart User Guide

Table of Contents

Table of Figures

Support and Contacting Information

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1 Introducing the LU2000

This chapter introduces the functionality of the LU2000 and describes its system architecture.

LU2000

The LU2000 receives (inputs) video streams from one or more LiveU units (LU40, LU70L, LU400) via a standard Internet connection and reconstructs the original video signal(s) from each one. The LU2000 server runs multiple Multi-Media Hub (MMH) instances. Each MMH recombines the streams received from a specific LU into a discrete broadcast-quality video stream. The LU2000 then outputs a single reconstructed video stream over an integrated SDI interface for each LU stream to the destination of your choice. This enables you to transparently ingest video streams from the field, as if the cameras were connected to your system via a long cable.

NOTE	Because additional devices work together with the LU2000, contact LiveU support before using the LU2000.

The LU2000 must be a dedicated server that is either located locally (for example, at your broadcast center or playout center) or is accessible through a cloud.

The following video formats are supported:

- **SD:** PAL(576i, 576p), NTSC(480i, 480p)
- **HD:** 720p25/29.97/30/50/59.94/60, 1080i25/29.97/30/50/59.94/60, 1080p25/29.97/30/50/59.94

The LU2000 can have one or more of the following output ports:

- DeckLink SDI / DeckLink SDI 4K
- DeckLink Duo
- DeckLink Quad
- IP Stream: Alternatively, the LU2000 can stream the reconstructed video stream to a specified IP address through the Internet.

System Architecture

The following describes the system architecture of the LU2000:

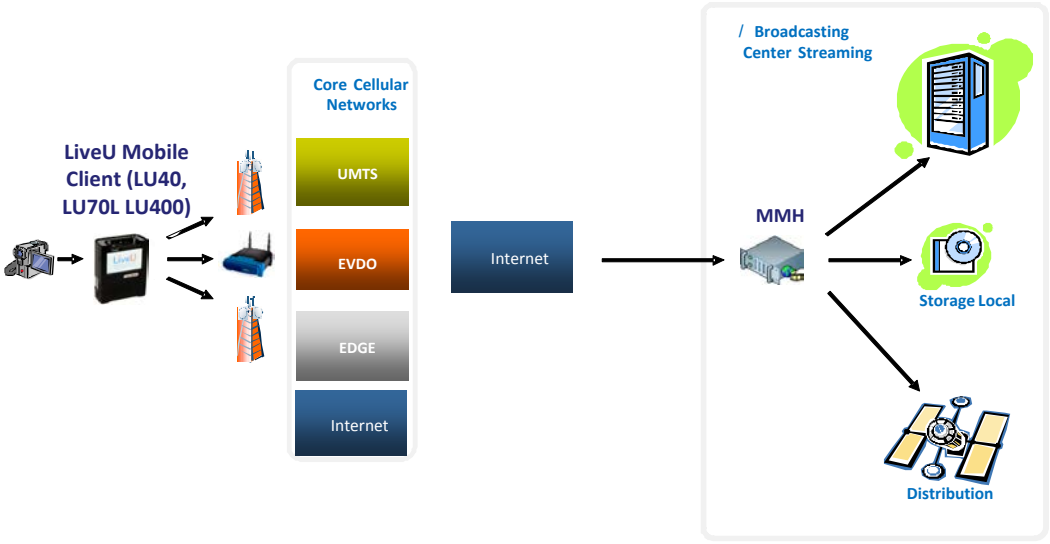


Figure 1: LU Unit and LU2000 System Architecture

1. Each camera operator in the field uses an LU unit to stream video.
   - Each camera operator (carrying a camera and LU unit) may be in a different location. For example, in Toronto, Tokyo, New York, Boston and so on.
   - One camera is connected to each LU unit.
2. The video from each camera is streamed by the LU unit to the Internet using local cellular networks and/or a LAN. For example, AT&T, Verizon, Sprint or T-Mobile. Each LU unit has multiple modems.
3. The LU unit dials (connects) its modems to the cellular networks in its area (and possibly the LAN and/or WiFi) and combines their bandwidth into a single consolidated broadband uplink connection.
4. The LU unit encodes the video received from the camera that is connected to it into an H.264 stream and transmits it over the aggregated bandwidth.

   Each LU unit can be configured to transmit its video streams to a single MMH instance.
5. Multiple camera operators may be streaming video from multiple LU units at the same time.
6. The LU2000 receives the various video streams from each LU unit via a standard Internet connection.

   For each LU unit, the LU2000 uses LiveU's proprietary logic to reconstruct and recombine these various streams (received from the LU unit modems) into a discrete broadcast-quality video stream (identical to the original video signal(s) output by the camera).

The LU2000 server can run multiple instances of the MMH application. Each LU2000 instance can stream a single LU at a time. The more powerful the CPU of the server on which the LU2000 software runs, the more MMH instances can run on it (each reconstructing the data streams of a single LU unit).

Up to 18 MMH instances can be installed on a single LU2000 server according to the number of output ports configured in that server.

NOTE	To support the Virtual Channel feature, the LU2000 supports up to four output channels and 10 preview channels.

A maximum of four MMH instances can be connected to an SDI video output on an LU2000 and up to five MMH instances can be IP ports (Internet broadcasting).

7 For each LU unit, the MMH outputs a single reconstructed video stream to the destination of your choice. While doing so, the MMH performs forward error correction and employs retransmission algorithms in order to achieve maximum quality with regard to end-user experience, video quality and resilience.

You can configure the MMH to stream the video from each LU unit to the same or to a different destination and through a different output port simultaneously.

Physical and Logical LU2000

The LU2000 can be installed on a server that is:

- **Physical:** In this case, the LU2000 is installed on a server located locally. For example, in your server room/broadcasting/playout center.
- **Logical:** In this case, the LU2000 is installed on a server that is accessed through a cloud. This type of LU2000 is typically installed in a server farm.

For both cases, the LU2000 must be a dedicated server that runs one or more instances of the LU2000 software and nothing else.

The LU2000 installation process erases the entire hard disk of the computer. The installation process for both options is the same, as described in *Chapter 2, Installing the LU2000* on page 12.

Physical LU2000

In this case, you use a local server on which you installed the LU2000 software. This server can have the IP/physical output ports that you require. The following options are supported by the LU2000:

- DeckLink SDI / DeckLink SDI 4K
- DeckLink DUO
- DeckLink Quad
- IP Stream

Logical LU2000

If you only intend to use the LU2000's IP video streaming option (meaning that you do not need to output to SDI), then the Logical LU2000 option is simpler and less expensive for your purposes.

In this case, the LU2000 software runs somewhere in the cloud. For example, on a server farm that can be accessed through the Internet.

LiveU Central

LiveU Central enables you to manage and configure LU units and MMHs through a standard Internet browser. Each LiveU Central user is assigned permission to manage a specific group of LU units and MMHs:

- **LU Unit Management and Control:** LiveU Central enables you to view LU unit and MMH status and to remotely configure an LU unit and MMH.
- **LU2000 File Management:** LiveU Central enables you to browse, play and broadcast the files saved by LU units on an LU2000.

You may refer to the *LiveU Central User Guide* for more information.

LU2000 Server Requirements

The following provides the minimum hardware requirements for an LU2000 server with one, two or four channels (MMH instances). For the hardware requirements of an LU2000 with other numbers of channels (MMH instances), contact LiveU support.

Single-channel/Dual-channel LU2000 General Hardware Requirements

The minimum hardware required to work with a single-channel or dual-channel LU2000 server includes:

- Standard PC desktop or 1U server:
  - CPU – Core E3-1240v2.
  - Memory – 8 GB or more.
  - Hard Disk Drive – 500 GB or more.
  - R210 II EMEA Ship Docs, No Power Cord
  - OEM R210 II Rack Bezel
  - 1TB, SATA, 3.5-in, 7.2K RPM Hard Drive (Cabled)
  - 2M Rack Power Cord C13/C14 12A
  - iDRAC6 Express
  - 2/4-Post Static Rack Rails

  - C1 2HD – No RAID with On-board SATA Controller, Minimum 1, Maximum 2 SATA-only Drives
  - PowerEdge Order – EDB
- The Internet connection should have at least 5Mbps downlink capacity and at least 1Mbps uplink capacity. Instances can run simultaneously.
- Video Output Card: Blackmagic SDI card or Duo card (single instance or multiple).
- Ubuntu 12.04.5 Operating System.
- Additional Requirements:
  - The LU2000 should be connected to the Internet and have a publicly reachable IP address with the ability to open ports.
  - The server should be *clean* from other program installations.
  - The Startup menu should be empty from other programs.
  - The server should be behind a firewall.

Four-channel LU2000 General Hardware Requirements

The following is an example of the hardware requirements for an LU2000 server with four channels (MMH instances):

- Supermicro 5017R-MF:
  - Supermicro 1U, UP Barebone System, LGA2011, Short Depth, Internal HDD w/PS 350W.
  - Processor – Intel® Xeon® Processor E5-1650 v2 (12M Cache, 3.50GHz).
  - Server Memory – DDR3-1866 4GB/512Mx72 ECC/REG PC3-14900 C.
  - 256GB 2.5-inch SATA3/SATA 6.0 GB/s Solid State Drive, MLC.
  - Supermicro Single 2.5" Fixed HDD Mounting Bracket.
  - Supermicro Mounting Rails 25.6" to 33.05" Chassis Rail Set for SC512F
  - Quick Release 19" to 26.4" Outer Rail, /Quick, for 1U 17.2" W Chassis (MCP-290-00004-03 Required).
- Video Output Card: BlackMagic's Quad card (up to four instances).
- Ubuntu 12.04.5 Operating System.
- Additional Requirements:
  - The LU2000 should be connected to the Internet and have a publicly reachable IP address with the ability to open ports.
  - The server should be *clean* from other program installations.
  - The Startup menu should be empty from other programs.
  - The server should be behind a firewall.
  - The server should have antivirus software.

LU2000 Network Requirements

The following ports must be opened/forwarded on the router in order to enable flow between the LU unit and the LU2000:

Table 1: LU2000 Network Requirements

Source IP	Destination IP	Protocol	Ports
Any (Internet)	MMH	UDP	Default: 9000-9017
MMH	Any	TCP	80, 10000, 10020, 8400-8600
Any (Internet)	MMH	TCP	Default: 1935, 18255

Launching the LU2000

The LU2000 server can run multiple instances of the MMH application. An instance of the MMH is a copy of the MMH application running independently on the same LU2000 server. Each MMH instance can stream a single LU unit at a time.

Immediately after the LU2000 has been installed, as described in *Chapter 2, Installing the LU2000* on page 12, all MMH instances are running.

Each time the LU2000 server is restarted, all MMH instances launch automatically.

The MMH does not display any windows or messages. It runs completely in the background.

The LU2000 should be up and running *before* the LU unit tries to connect.

Always ensure that the LU2000 is connected to the Internet and that the selected ports of the LU2000 machine and their associated firewall are open to receive transmissions via public Internet.

FTP and Store and Forward to the MMH

The LU unit can transfer prerecorded files or documents to the MMH using its FTP or Store & Forward feature. The LiveU Central **Files** tab enables you to remotely browse, play and delete these files on the MMH.

You may refer to the *LiveU Central User Guide*, which describes how to manage and control LU units and MMHs on an LU2000 server through a standard Internet browser.

NOTE	To preview and/or transfer files outside the subnet/LAN on which LiveU Central is located, see page 18 for more information.

2 Installing the LU2000

The chapter describes how to install and set up the LU2000 so that it is ready for operation.

Installation Workflow Overview

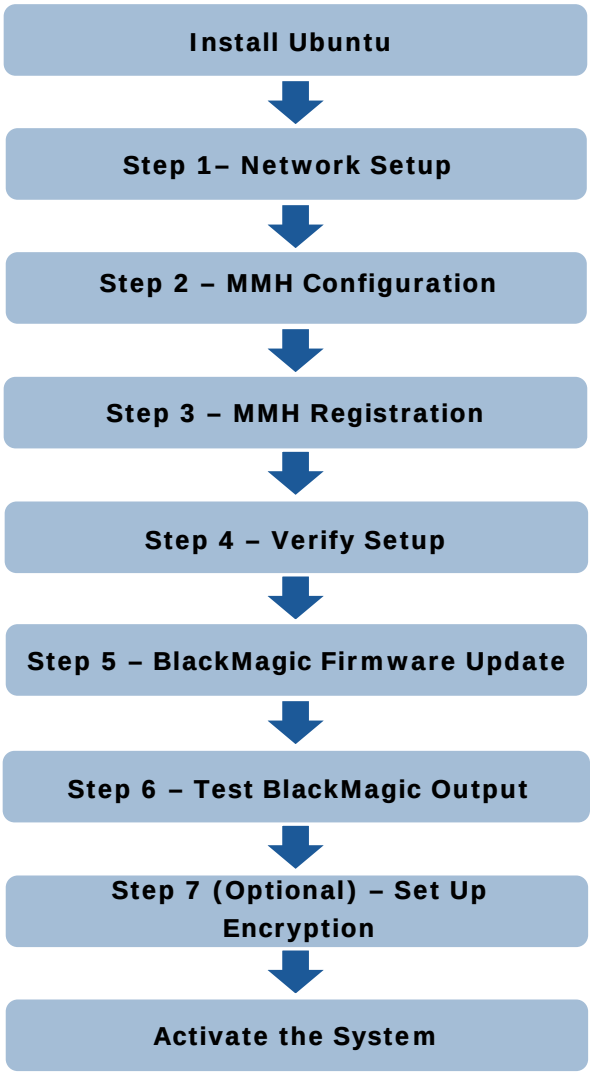
Begin by installing Ubuntu 12.04.5. Install it from the debian file, either from a USB driver or by copying to the server.

WARNINGS!	Installation erases the entire hard disk of the computer. Therefore, you must back up all the files on the computer before installing the LU2000. Do not upgrade to Ubuntu 14.04 after installing the Ubuntu operating system.

The installation process is the same for all types of LU2000s.

NOTE	To install your MMH in a cloud, contact LiveU support who will handle the entire process of purchasing, installation and setup for you.

To install the LU2000:



Installing Ubuntu

The first stage of installing the LU2000 is to install Ubuntu 12.04.5 onto your computer, as described below.

To install Ubuntu 12.04.5:

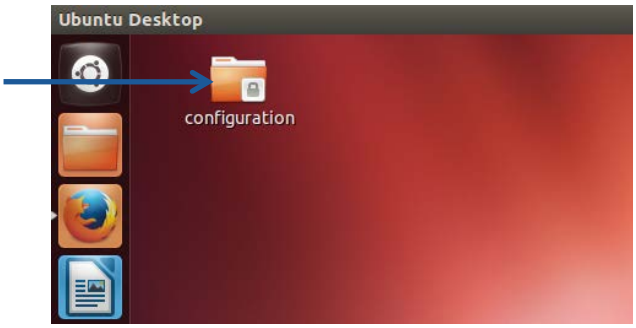
1. Download and install Ubuntu 12.04.5.
2. Copy the MMH debian installation to a USB drive.
3. Insert the USB drive into a USB port on the server.
4. From the server terminal, run the following command:

   sudo apt-get install gdebi

5. Install the MMH by running the following:

   sudo gdebi-gtk /media/<path to the debian installation file>

A folder named **Configuration** is then created on your desktop. All other content on this computer has been erased, and therefore this is the only icon that appears on your desktop. For example, as shown below:

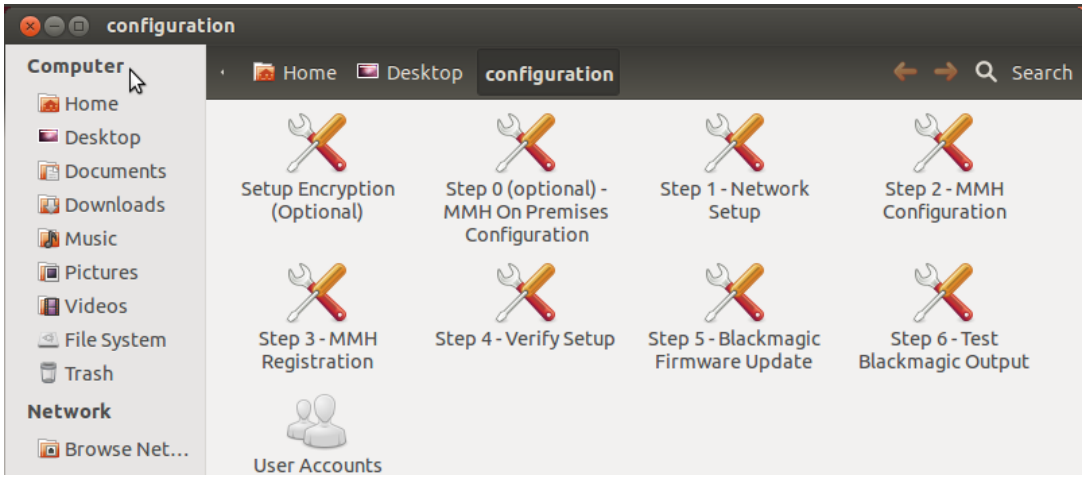


Six-step Installation Process

The remainder of the installation process is performed by simply following the easy steps described below.

To perform the guided installation process:

- Double-click the **LiveU** folder, described above, to display its contents, as shown below:



This window shows the steps to be performed and their order. All these steps are mandatory and should be performed in the specified sequence.

Step 1 – Network Setup

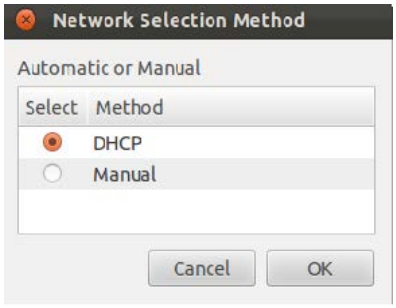
This step enables you to define the network through which the LU2000 connects to the Internet. The LU2000 uses the Internet to receive video streams from the LU unit, to download updates to software during installation and to register the LU2000 with LiveU.

The LU2000 can also use the Internet connection to stream IP video to the destination of your choice.

To set up the network:

1 Double-click the **Step 1– Network Setup** icon:

The following window is displayed:



2 Either:

Select **DHCP** to specify that access to your network is defined automatically.

– OR –

Select the **Manual** option to define access to your network manually, as described below.

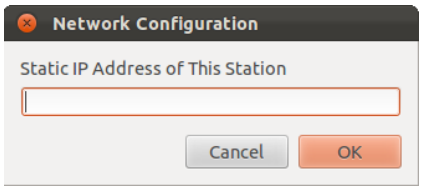
If you are not familiar with the parameters requested in the following windows, then consult with your network administrator.

- Click the **OK** button. The following window is displayed listing the Ethernet cards on your computer:

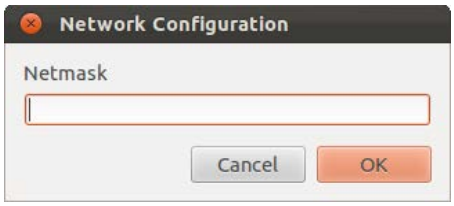
- Select the Ethernet card to be used to communicate with the Internet and click the **OK** button.

  If you selected the **DHCP** option above, then you can now skip to the *Step 2 – MMH Configuration* section on page 16.

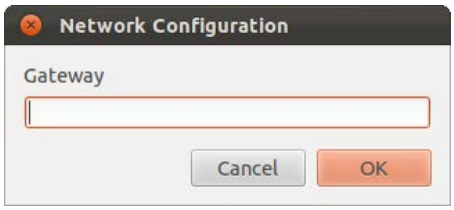
If you selected the **Manual** option above, then the following window is displayed:



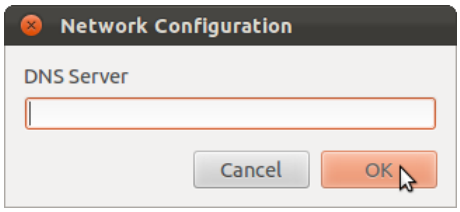
- Enter the IP address of this computer and click the **OK** button. The following window is displayed:



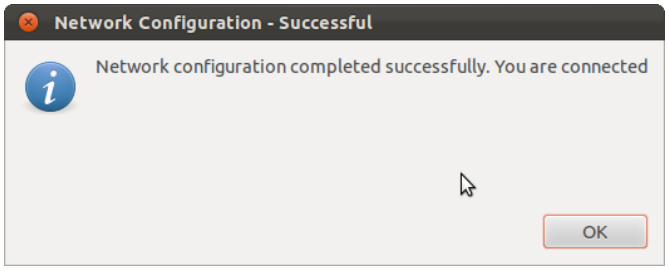
- Enter the net mask to be used by the LU2000. Typically, this is **255.255.255.0**. Click the **OK** button. The following window is displayed:



- Enter the gateway to be used by the LU2000 and click the **OK** button. The following window is displayed:



- Enter the DNS server to be used by the LU2000 and click the **OK** button. The following window is displayed:



If you not sure what is the correct configuration, consult your system administrator. The LU2000 is now connected to the Internet.

Step 2 – MMH Configuration

An LU2000 server can run multiple instances of the MMH software. This step describes how to specify the number of instances to run on the same LU2000 server.

Each LU unit can be configured to communicate with a specific LU2000 server (as defined by its IP address) and to a specific MMH instance (as defined by the UDP port that you specify in this step).

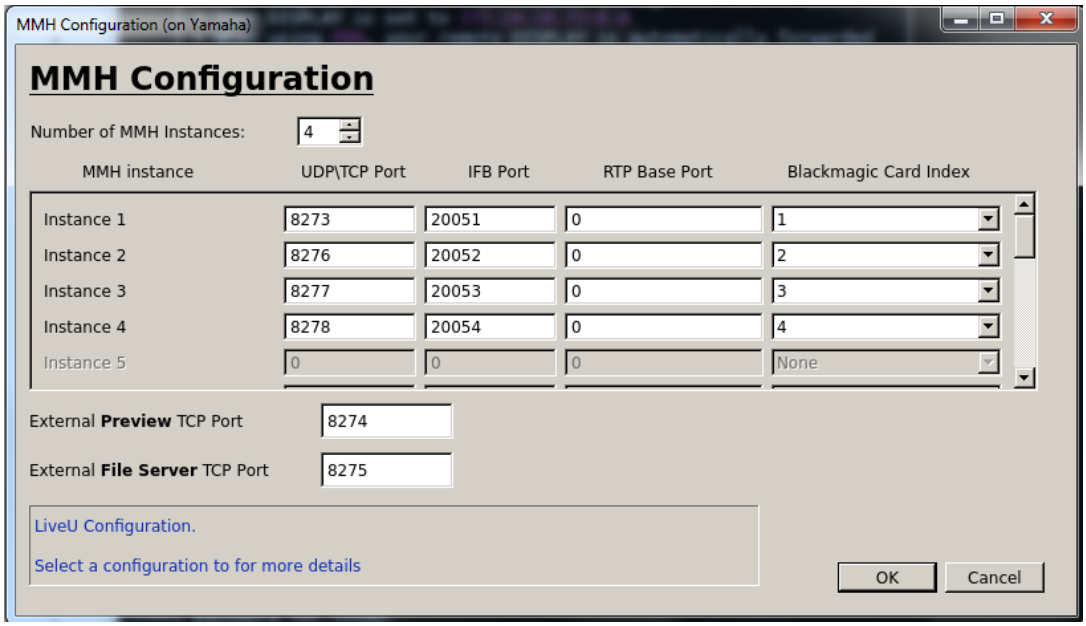
NOTE	Make sure that the actual server machine that you use can support the number of MMH instances that you define. You may refer to the *LU2000 Server Requirements* section on page 9 for a description of the server machine specifications and the number of MMHs that it can support.

On the LU unit, each MMH instance is called a *Channel*.

To configure the LU2000 (MMHs):

1 Double-click the **Step 2– MMH Configuration** icon:

The following window is displayed:



2 In the **Number of MMH Instances** field, enter the number of instances of the MMH software to run simultaneously. This should be done in accordance with the server machine specification.

3 After you enter the number of instances, the fields below it are activated. This enables you to enter the UDP, Panasonic stream and IFB port numbers to be used by each MMH instance. Enter these port numbers, as described below:

- Enter the **UDP port**, which is used for video. This field is mandatory.
- **For IFB:** Enter the **IFB Port**, which is used for the IFB feature.

- When IFB functionality is enabled on the LU2000, you must specify the IFB port to be used in the **IFB Port** field.
- When IFB functionality is not enabled on the LU2000, enter **0** in this field. The IFB Port is also a UDP-type port.

  For more details about the IFB feature, see *Appendix A*, *Interrupted Feedback (IFB)* on page 26.

IMPORTANT NOTE	If a configured MMH already exists to which you want to add IFB support, then you must reconfigure that MMH for this purpose. To do so, you must rerun **Step 2 – MMH Configuration** in the LU2000 installation process. You only need to rerun this step, and can skip all other steps in the LU2000 installation process. Before rerunning **Step 2 – MMH Configuration** for an existing configured MMH, you must know the current UDP video port in use by that MMH. The **UDP Port** value will not display when rerunning **Step 2 – MMH Configuration** for an existing configured MMH, and you will have to reenter it to complete the configuration. If necessary, obtain this port number from your IT representative.

- **For Panasonic Cameras:**
  - In the **UDP/TCP Port** field, specify the Panasonic control port (TCP) port. Be sure to open both TCP and UDP for LiveU and Panasonic.
  - In the **RTP Base Port**, enter an even-numbered port. This is the port used for streaming from a Panasonic camera. Panasonic cameras use six UDP ports for streaming, meaning X + 5 (four of these five ports are consecutive ports and the last port is the [last consecutive port + 2]).
  - For example, if the **RTP Base Port** is 8000, then ports 8001, 8002, 8003, 8004, 8006 are also used for this instance.

NOTE	Be sure to open the configured ports in the firewall.

  - When Panasonic camera functionality is not enabled on the LU2000, enter **0** in the **RTP Base Port** field.

4 By default, the S&F and FTP files along with video previews (for example, using the virtual matrix) are limited to the internal subnet/LAN only.

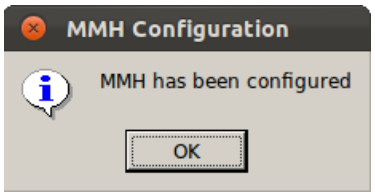
In order to preview or download files from **outside** the subnet/LAN on which LiveU Central is located, you must configure the TCP ports to be used for these purposes and then map them to the proper MMH internal input port, as follows:

- **External Preview TCP Port:** In the adjacent box, enter the TCP port to be used in order to preview video from outside the subnet. You must also map the value that you enter here to the MMH internal input port, which is 1935. If this value is blank, previewing from outside the subnet is disabled.

- **External File Server TCP Port:** In the adjacent box, enter the TCP port to be used for the Store & Forward and FTP feature for transferring files from outside the subnet. You must also map the value that you enter here to the MMH internal input port, which is 18255. If this value is blank, transferring files from outside the subnet is disabled.

IMPORTANT NOTE	If the **External Preview TCP Port** value is blank, then you can preview files **only** from inside the subnet/LAN on which LiveU Central is located. If the **External File Server TCP Port** value is blank, then you can transfer files **only** from inside the subnet/LAN on which LiveU Central is located. Once you enable the **External Preview TCP Port** and/or the **External File Server TCP Port** by entering port values, then you can no longer preview files or transfer files, respectively, from inside the subnet/LAN. For example, in order to preview or transfer files from inside the subnet, when opening LiveU Central on a PC that is located inside the subnet (office LAN), then both the **External Preview TCP Port** and/or the **External File Server TCP Port** fields should be empty. When opening LiveU Central on a PC that is located outside the subnet, then both the **External Preview TCP Port** and/or the **External File Server TCP Port** fields must have values in order to preview/transfer files, respectively, from outside the subnet. You can specify TCP port values for either the **External Preview TCP Port** or the **External File Server TCP Port** field, or both of them.

5 Click the **OK** button. The following confirmation message is then displayed:



6 Click the **OK** button. All windows then close.

Step 3 – MMH Registration

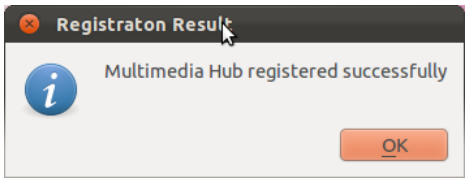
This step describes how to register the LU2000 with LiveU in order to enable its activation.

To register the LU2000:

1 Double-click the **Step 3 – MMH Registration** icon:

The following window is displayed:

2 Fill in the fields of this window and then click the **OK** button. The following success message is then displayed:



Step 4 – Verify Setup

This is an essential and important step in which you run an automatic test that checks that the LU2000 has been installed and set up properly (as was described in the previous steps in this user guide). This test checks that the LU2000 can connect to the Internet. For example, by accessing google.com.

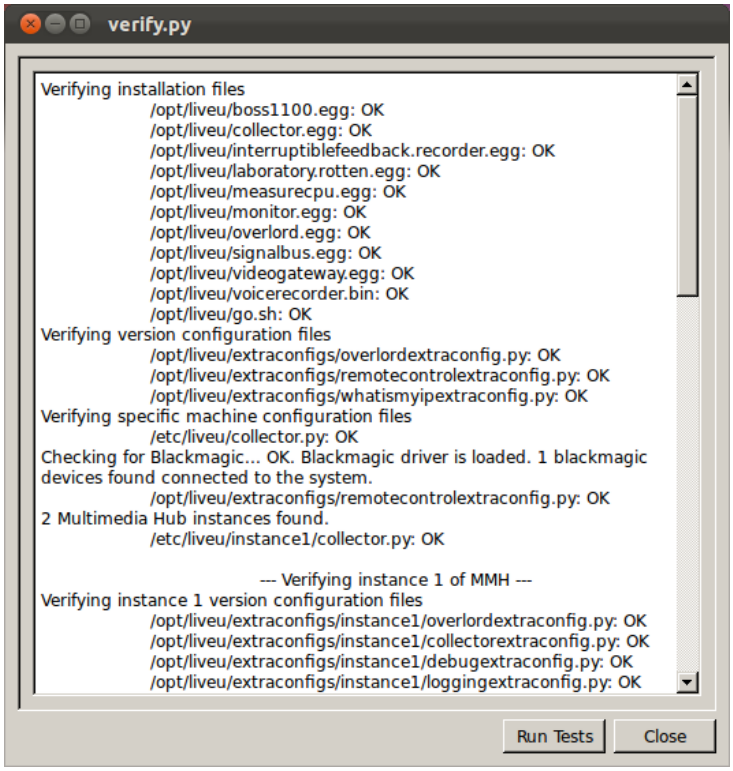
To verify LU2000 setup:

1 Double-click the **Step 4 – Verify Setup** icon:

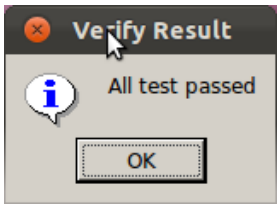
The test automatically starts to run.

NOTE	You do not have to press the **Run Tests** button. This button exists to enable you to rerun the test.

A variety of information is then displayed in the following window:



2 Wait until the following successful message is displayed:



If the verification fails, double-check the configuration and then try again. If it still does not succeed, then contact LiveU support.

Step 5 – BlackMagic Firmware Update

This step is only necessary if your LU2000 has a BlackMagic video card.

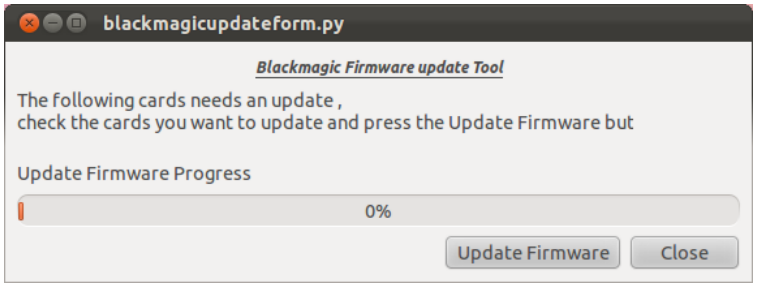
This step describes how to verify and update the firmware (if needed) of the BlackMagic video card through which the LU2000 outputs video.

To verify the firmware version on the BlackMagic video card:

- Double-click the **Step 5 – Blackmagic Firmware Update** icon:

The LU2000 software then checks whether the BlackMagic video card installed on this computer has the latest firmware update. If it is updated, then the following success message window is displayed:

If a window is displayed offering to update the BlackMagic firmware, then do it. For example, as shown below:



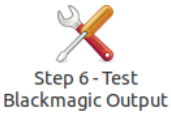
Step 6 – Test BlackMagic Output

This step is only necessary if your LU2000 has a BlackMagic video card.

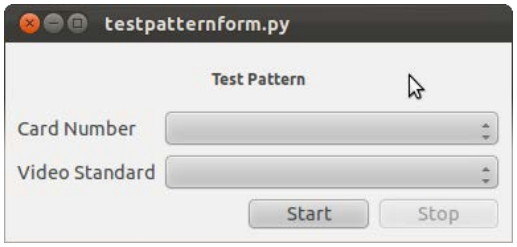
This step describes how to test that a predefined test pattern is being output from the BlackMagic video card.

To verify BlackMagic output:

1. Connect a screen to the BlackMagic video card SDI output.
2. Double-click the **Step 6 – Test Blackmagic Output** icon:



The following window is then displayed:



A specific BlackMagic card can have a single SDI port or four SDI ports (called a Quad card). You must check each one separately.

3 In the **Card Number** field, select which BlackMagic card output to test:

- If the BlackMagic card has only a single output port, then leave the number **1** in this field.
- If the BlackMagic card has multiple sub-cards, then each one must be tested by selecting its number in this field and performing the following steps.

4 In the **Video Standard** field, select which video standard to be output:

- **SD:** PAL(576i,576p), NTSC(480i, 480p)
- **HD:** 720p25/29.97/30/50/59.94/60, 1080i50/59.94/60, 1080p25/29.97/30/50/59.94

5 Click the **Start** button. The BlackMagic card then starts outputting a video test pattern, which is displayed on the screen connected to the selected card.

NOTE	The displayed video may flicker. This is normal and is not an indication of its quality.

Step 7 (Optional) – Setting Up Encryption

If required, the LU2000 can be configured to enable encryption of the stream that is transmitted from the LU units to the LU2000. For details about how to do so, contact LiveU Support.

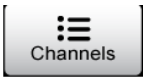
Activating the System

Activating the LU2000

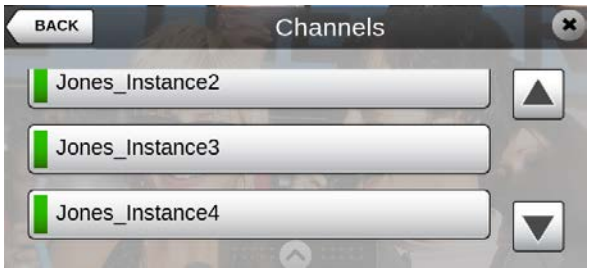
After installation has been completed, send an email to **support@liveu.tv** that includes all the details you provided in *Step 3 – MMH Registration* on page 19, along with your LiveU Central user name, if you have one.

On the LU Unit

To start streaming from the LU unit:

1 Select a channel (MMH) to which to stream by tapping the 

button to display the following screen:



2 Tap one of the channels to which you would like to stream. You can use the up and down arrow buttons to scroll through the channels.

You may refer to the *Step 4, Selecting a Channel* section in the *LiveU LU40 User Guide* for more information.

3 To start transmitting the video to the channel that you selected, tap the **Ready** button, which changes to display the word **Live**, as shown below:

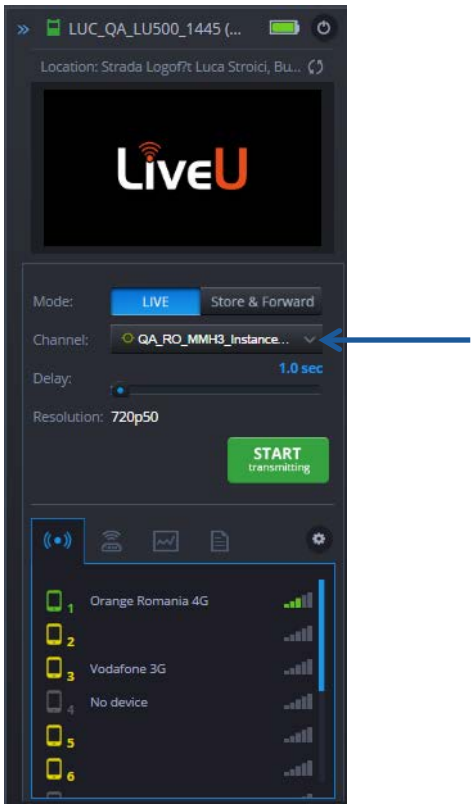
All camera video is now transmitted and should be visible on the LU unit screen.

On LiveU Central

The following step can be performed in order to configure an LU unit to steam to a specific MMH, instead of step **1** and **2** on the previous page.

To use LiveU Central to start LU unit streaming:

1 Click the MMH dropdown menu, as shown below, to display a list of the MMHs to which this LU unit has been assigned, meaning to which this LU unit can stream video.



2 To start streaming, press the 

button to start streaming the video from the LU unit. This button appears in the LU unit's row when the LU unit is in Ready () state (meaning that it is on, connected to LiveU Central and is not currently streaming).

You may refer to the *LiveU Central User Guide* for more information.

A Interrupted Feedback (IFB)

This appendix describes the Interrupted Feedback (IFB) feature, how to set it up and how to operate it.

IFB Overview

LiveU's IFB feature enables personnel in the master control room (MCR) to broadcast verbal instructions or information about events to LU device operators in the field.

LU operators can listen to an audio-only channel received from the IFB server using earphones/headphones, even while broadcasting. IFB uses a unidirectional audio channel from the LU2000 to the LU device, which only allows the LU operator to listen, but not respond.

Currently, IFB supports the KOMPLETE AUDIO 6 sound card and the PreSonus AudioBox 1818VSL recording system (a 1U audio interface device), which must be plugged into the LU2000 through its USB port.

For more details about the KOMPLETE AUDIO 6 device, go to http://www.native-instruments.com/en/products/komplete/audio-interfaces/komplete-audio-6/.

Figure 2: KOMPLETE AUDIO 6 Device – 1

For more information about PreSonus AudioBox 1818VSL device, go to http://www.presonus.com/products/AudioBox-1818VSL.

Figure 3: PreSonus AudioBox 1818VSL – 1

NOTE	For a single-channel server, you can alternatively use the Creative Sound Blaster X-Fi Surround 5.1 Pro USB sound card. For more details, go to http://us.store.creative.com/Creative-Sound-Blaster-XFi-Surround-5.1/M/B0044DEDCA.htm.

Figure 4: Creative Sound Blaster X-Fi Surround 5.1 Pro USB Sound Card

NOTE	For IFB to operate properly, the audio card must be plugged into the LU2000 **before** starting transmission. You can either plug in the audio card before or after LU2000 installation.

IFB is automatically installed during LU2000 server installation. Several parameters must be configured to enable the IFB feature, which are described on page 17.

IFB Setup and Operation

Perform the steps below before beginning streaming, in order to ensure proper IFB operation. The procedure below describes setup and operation when using the KOMPLETE AUDIO 6 sound card or the PreSonus AudioBox 1818VSL device. The procedure for other supported devices is the same.

To set up and operate IFB:

1. Configure the IFB for each MMH instance, as described on page 17.
2. Plug in the KOMPLETE AUDIO 6 sound card/PreSonus AudioBox 1818VSL into USB port on the back of the LU2000. The card must be plugged into this port.
3. Connect the microphone(s) to the KOMPLETE AUDIO 6/PreSonus AudioBox 1818VSL device. Use standard microphones that connect using an XLR connection.

Figure 5: KOMPLETE AUDIO 6 – 2

Figure 6: PreSonus AudioBox 1818VSL – 2

IMPORTANT	IFB works per MMH instance. This means that each microphone connected to the KOMPLETE AUDIO 6/PreSonus AudioBox 1818VSL device is automatically assigned to a specific MMH instance in the order of the input port to which it is connected. For example, a microphone connected to Input 1 is assigned to MMH instance 1, a microphone connected to Input 2 is assigned to MMH instance 2 and so on. If you plan to use IFB with multiple MMH instances in parallel, each with its own microphone, contact LiveU support.

NOTE	For IFB, each microphone can only be used by one MMH. Each MMH is connected to a single LU device, which means that each microphone is only used on a single LU device.

You are now ready to begin streaming using IFB to the LU device.

The LU device operator must also plug in his/her earphones/headphones in order to be able to hear. **This must be done before streaming begins.** If the earphones/headphones are connected after the start of streaming, the LU device operator cannot hear anything on the IFB channel.

During streaming, the IFB feature uses a 600ms delay, which means that the LU device operator hears the audio 6/10 of a second after the LU2000 operator speaks.

B Limitation of Liability and Warranty

This appendix provides the limitations on liability and warranty.

Limitation of Liability and Warranty

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