



# Unity 3 Server Configuration Manual

## Overview

The Unity Intercom system is a 128 channel full-duplex intercom system that can support up to 64 simultaneous devices including IOS, Android, Windows and Mac varieties. Each client can access any of the 128 channels in groups of 6. Unity can also use external audio interfaces to send and receive audio from other intercom systems and can also display tally signals from most video mixers directly on remote Unity Client displays.

## Introduction to Unity Server

Unity Server is a Mac OS X-based application that runs on OS X versions 10.9 and above. Unity Server communicates with remote devices using UDP communication resulting in efficient low-latency operation. Unity clients are available for IOS (version 7 or later), Android (version 4.0.1 or later), Mac OS X (version 10.9 or later) and Windows (Vista and later). The Windows version comes in two flavors: desktop and tablet formats.

Although the UDP protocol allows for low-latency communication, it is not a guaranteed-delivery protocol and audio packets can be lost on the network. Therefore it is strongly recommended (but not required) that the computer running Unity Server be hard-wired into the network using standard network wiring. Unity Server transmits Bonjour packets that remote devices can use for server discovery but optionally, remote devices can be configured to direct-connect to the Unity Server using the server's DNS name or IP address and network port number. This may be necessary when Unity Server is used in networks that have disabled Bonjour or otherwise have Examples of this include multiple-subnet networks, and networks that consist of more than one VLAN. (Bonjour usually will not cross VLAN boundaries).

## Basic Unity Configuration

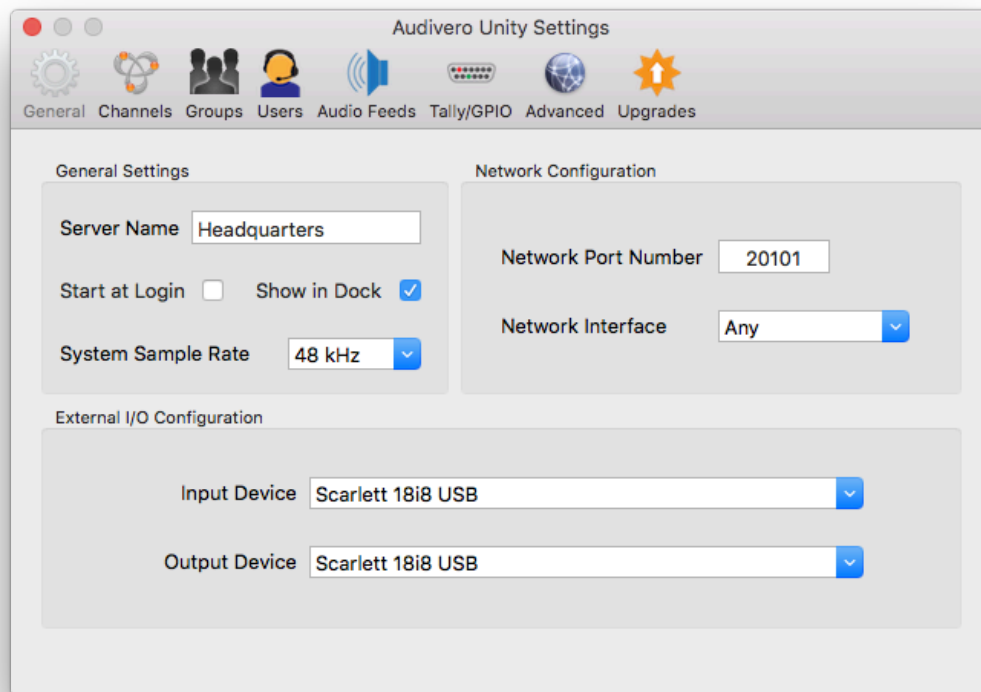
To begin using Unity, you must first configure a few basic settings. Since Unity is a network-based communication

system, you must first connect your Mac to either a hard-wired network or a Wi-Fi network that all of the remote Unity client devices in the system can access. Next, you must specify an audio device for system timing purposes. If input devices are available on your Mac, you can specify this using the *Input Device* drop-down box. Usually this will be the *Built-In Line Input* of your Mac. If no audio input devices are available, Unity will use the default audio output device for timing reference. Next, create a user on the *Users* tab. Click the “+” button at the bottom left and fill in the required information to create a user. You must create a *Username*, *Password* and *Enable* that user for them to be able to use Unity. After completing these steps, a user should be able to open Unity on their remote client device, log in, and begin using Unity to talk and listen to other users on the system.

## Unity Settings - General

You install Unity by downloading a DMG file from either [unityintercom.com](http://unityintercom.com) or your local Unity vendor's website. Mount the DMG file and drag the Unity Server application to your Applications folder right inside the DMG file installation screen. Once installed, you can launch Unity Server from your Mac Applications folder. Once launched, you will be prompted to enter an activation code that you received in your welcome email from the Unity Intercom website or from your Unity dealer. Note that you must have internet access to successfully activate Unity Server. After this, you will only need internet connectivity if you are adding Unity licenses or need external network access to your server.

After activation, you'll see the Unity Server icon appear in the top menu bar of your computer. Selecting *Settings* from the Unity menu will show you a window similar to the following:



**Server Name-** This is a simple text description for the server installation. It will be used by Unity Clients to enable fast logoff/logon switching and previous server attachment memory. Otherwise it is not used in the server itself and

can be left blank.

**Start at Login**- If this box is checked, the Unity Server will start automatically each time a user logs into the Mac. If not checked, Unity Server will have to be manually started. Unity Server runs as a user process on the Mac, so a valid Mac user must be logged in for Unity Server to operate. Unity Server does not run as a background service.

**Show in Dock** – Checking this box tells Unity Server to create an application icon in the system dock window, and add an entry into the task list so that the application can be accessed through standard OS X navigation routines (such as Command-Tab). If left unchecked, Unity runs in the top-bar as a system tray application.

**System Sample Rate** – At the core level, Unity Server runs at either 48 kHz or 44.1 kHz sample rates. In most cases you should leave this set to the default 48 kHz, since most modern devices support 48kHz operation natively. Use 44.1 kHz if your audio hardware is restricted to 44.1 kHz operation only. All remote devices will switch automatically to run at the system sample rate set here in the server.

**Network Port Number** – The Unity Server transmits and receives audio packets using UDP sockets, and this setting specifies which UDP port number the server will use for incoming connections. Unity also uses the same port number with the TCP protocol for transferring user list information. The default port number is 20101 and should work fine for most installations. If you desire to access your Unity Server remotely from outside your network, this is the port number that generally needs to be forwarded through your firewall to your Unity Server. Make sure you forward both the TCP and UDP ports.

**Network Interface** – This pull-down allows you to specify what network interface Unity Server uses if your computer has more than one. This can normally be left at “Any”, but you might want to restrict it to a particular interface if you are using a Dante Virtual Soundcard as your audio device and want to keep the Unity traffic separate from the Dante network.

**Input Device** – You must select an audio input capable of either 48 kHz or 44.1 kHz audio as a timing source for the

Unity Server. In addition, any program audio feed (like your Front Of House audio mix) will also be input through this device. This will usually be the line input of your Mac or any commercially available audio interface compatible with the Mac. If your Mac does not have any audio input devices, Unity Server will use the default audio output device specified in System Preferences as the timing reference.

**Output Device** – The audio output device is optionally specified for sending Unity PL traffic to certain audio output destinations. If specified, this must be an audio output device capable of either 48 kHz or 44.1 kHz audio.

## Unity Settings - Channels

Selecting the *Channels* button on the Unity Settings toolbar will display the Unity channel configuration screen. An example configuration of 12 channels is shown below:

Label	Abbreviation	Input Number	Input Level	Input Gate	Output Number	Output Level	Test
SC Tech	TEK	1	0 db	-∞ db	1	-20 db	<input type="checkbox"/>
SC Sup Prod	SP	N/A	0 db	-30 db	N/A	0 db	<input type="checkbox"/>
SC Officers	OFC	N/A	0 db	-30 db	N/A	0 db	<input type="checkbox"/>
SC Local Talk	LOC	N/A	0 db	-30 db	N/A	0 db	<input type="checkbox"/>
SC Cameras	CAM	N/A	0 db	-30 db	N/A	0 db	<input type="checkbox"/>
SC AP Coord	AP	N/A	0 db	-30 db	N/A	0 db	<input type="checkbox"/>
FL Tech	TEK	N/A	0 db	-30 db	N/A	0 db	<input type="checkbox"/>
FL Sup Prod	SP	N/A	0 db	-30 db	N/A	0 db	<input type="checkbox"/>
FL Officers	OFC	N/A	0 db	-30 db	N/A	0 db	<input type="checkbox"/>
FL Local Talk	LOC	N/A	0 db	-30 db	N/A	0 db	<input type="checkbox"/>
FL Cameras	CAM	N/A	0 db	-30 db	N/A	0 db	<input type="checkbox"/>
FL AP Coord	AP	N/A	0 db	-30 db	N/A	0 db	<input type="checkbox"/>

*Note:*  
The same row/column relocation described in this section can be performed on most tables throughout the Unity Server setup process.

This table can be sorted in increasing/decreasing alphabetic order by clicking on either the *Label*, *Abbreviation*, *Input Number* or *Output Number* columns. Individual entries can be rearranged by simply dragging and dropping the horizontal rows. In addition, the columns can also be rearranged by dragging a column to a different position on the screen. These changes will be saved between Unity Server sessions.

**Label** – This is an alpha-numeric description for the specified PL channel. It is displayed by the information display on each client, and is also used by the Groups assignment page of the server.

**Abbreviation** – A short version of the channel label that is used by the Users page and is also displayed in the channel selection wheel of each Unity client. It is recommended to keep these abbreviations to four characters or less for readability, but note that each Unity Client will scale the text appropriately according to content.

**Input Number** – This specifies which input number from the *Input Device* specified on the *General* page will be mixed-in with regular Unity party-line communications. This audio will only be sent to remote Unity Clients and will not be sent back to any specified *Output Number*.

**Input Level** – This sets the audio input level for the audio input specified in the *Input Number* setting. The default for this is 0db, which implies no signal boost or reduction. The valid range for this is from -20db to +10db.

*Note:*  
Setting the Input Gate to  $-\infty$ db will result in the Unity Server continuously transmitting audio. This may have a negative effect on cellular data usage for remote clients.

**Input Gate** – This sets a noise gate threshold for audio arriving at the specified *Input Number*. The signal power must be higher than this setting in order for the audio to be heard by the various Unity Clients. The valid range for this is from  $-\infty$  (audio continually streams regardless of the input level) to -24db.

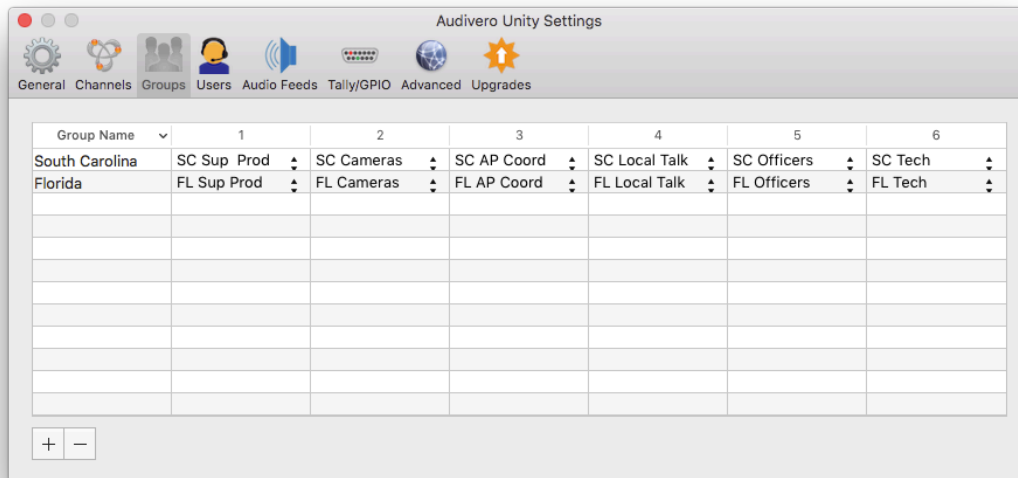
**Output Number** – This specifies which output number from the *Output Device* specified on the *General* page will receive any audio generated by Unity Clients.

**Output Level** – This sets the audio output level for the audio output specified in the *Output Number* setting. The default for this is 0db. The valid range of adjustment is from -20db to +10db.

**Test** – If this is clicked, a 1 kHz test tone will be generated for 10 seconds to the output specified in *Output Number*, as well as all Unity Clients that are listening to the specified channel. This helps verify system connectivity and operation.

## Unity Settings - Groups

Selecting the *Groups* button on the Unity Settings toolbar will display the Unity group configuration screen. An example of this configured with two groups is shown below:



Remote Unity Clients can only access the Unity party-line channels in groups of 6 channels. This screen is used to specify which channels from the *Channels* page are contained in each group. Users may or may not have access to each group based on their *Users* page assignments.

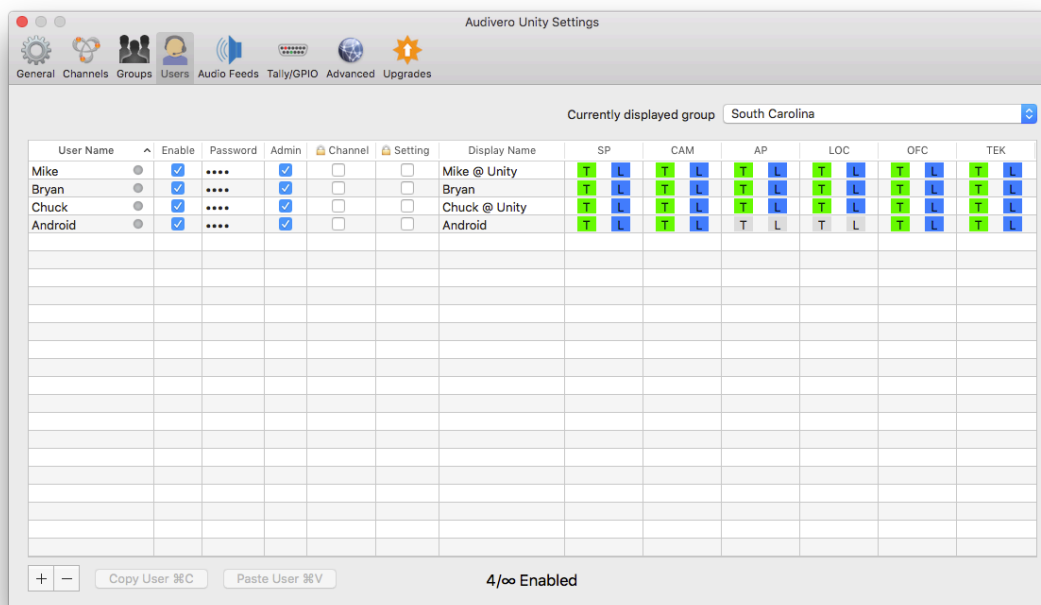
**Group Name** – A simple text description for the specified group. This name will appear on remote Unity Clients that have access to multiple groups simultaneously.

**1 - 6** – The columns 1-6 correspond to the six channels available on the attached Unity Clients. Select which of the 128 channels from the *Channels* page are to be used by each of the six remote channels. Leaving any column set to N/A will prevent channel access.



## Unity Settings - Users

Selecting the “Users” button on the Unity Settings toolbar will display the Unity user configuration screen. An example of this configured with several users is shown below:



*Note:*  
If you've purchased a Unity Max license the total number of users will be unlimited, as denoted by the ∞ symbol.

At the bottom center of the window you can see the current number of enabled users out of the maximum number of users that you have purchased user licenses for. You can create as many users in the Unity Server as you want but can only enable up to the purchased number of users at any one time. If a user is disabled on the server when they attempt to login, they will see a dialog that their user is disabled and will not be able to login to the Unity system.

**Currently displayed group** – On the upper right portion of this page is a drop-down box containing all of the channel groups specified on the *Groups* page. You must select the desired group before assigning individual channel access to each user.

**User Name** – This is a unique name that remote users will use to log into the Unity system. This name must be unique and must be at least 2 characters long. This field is NOT case-sensitive.

On the right-hand side of the *User Name* field is an online status indicator. This indicator will be gray if the user is

offline, green if the user is online, and orange if the user is in the process of being removed from the system. The orange indicator will last for 15 seconds before the user is removed.

**Enabled** – Checking this box enables the currently selected user. If you try to enable more users than you have licenses for, an alert box will be displayed indicating that you have exceeded your number of user licenses.

**Password** – Unity App users must log in to the system using a combination of user name and password. The password must be at least 4 characters long and is NOT case sensitive.

*Note:  
Priority Calling is like an “all-page” function. It enables an admin user to “shout” over everyone else and flashes their screen.. This Priority Call function is only heard by the channels the admin user has selected to talk to.*

**Admin** – If this box is checked, the remote device used by this user will display two additional admin-only buttons. This allows the remote user to do Priority Calling, which not only overrides all other voice traffic but also flashes an indicator on all devices that the admin user is talking to. Admin users can also un-latch all communication from desired channels, clearing a channel from unnecessary chatter. Any number of users can be enabled as an Admin.

**Lock Channel** – If this box is checked, then the specified user is not allowed to select their own talk/listen channels. If checked, the users talk/listen channels will be set exactly the same way that it is on the *Users* configuration screen.

**Lock Setting** – If this box is checked, the specified user is not allowed to enter their own Settings window on their device. This is good for non-technical users.

**Display Name** – This field is sent to remote devices and is displayed at the top of the Unity app. This is simply a title for the user, and can be used for any purpose. This will display the *Username* by default. Normally the upper limit that will fit on a remote device is 20 characters. In the above example, it is used to indicate which camera the user is operating. If the user moves to a different camera each week, the *Display Name* can be changed to match their camera position. This field can be left blank and will result in the Username being displayed at the top of the client screen.

*Note:  
When a user selects a channel*

**Channel 1 through Channel 6** – The right hand 6 columns of the user page indicate the party line channel permissions

*to Talk to on their device, Listen will automatically be selected as well.*

for each user. The column headers will display the channel abbreviation configured on the *General* settings page. You can click on the T or L boxes to enable *talk* and *listen* privileges for each channel. Note that you cannot enable a 'Talk Only' channel: you can configure talk AND listen, listen only, or disable access completely for each channel.

*Note:  
You cannot remove a user that is currently enabled. You must first disable the user then, delete them from the system.*

**+ and - Buttons** — On the bottom left of the screen, you can see the *Add User* and *Remove User* buttons (“+” and “-“ respectively). To add a user, simply click the “+” button and fill in the Username and Password fields. To remove a user, highlight the desired user and click the “-” button. Note that a user must be disabled before you can remove them.

**Copy User/Paste User** – If you select a particular user by clicking on them with your mouse or track pad, you can copy and paste that user. The pasted user will have the same configuration as the copied user but will contain an incrementing number in the user name to guarantee uniqueness. The pasted user will also be disabled by default to avoid accidentally exceeding the maximum user license requirement.

## Unity Settings - Audio Feeds

Selecting the *Audio Feeds* tab will display the following window. Note that you must either be in trial mode, have purchased the Audio I/O License or the Advanced Program Feed License to use most of the features of this window.

The screenshot shows the Audivero Unity Settings window with the Audio Feeds tab selected. The window title is 'Audivero Unity Settings'. The top navigation bar includes: General, Channels, Groups, Users, Audio Feeds (selected), Tally/GPIO, Advanced, and Upgrades.

**Program Feed Input Labels**

Number	Default	Source	Program Feed Name
1	<input checked="" type="checkbox"/>	Audio Input 1	Streaming Music
2	<input type="checkbox"/>	SC Officers	Mix Minus
3	<input type="checkbox"/>	Audio Input 3	Master Feed
4	<input type="checkbox"/>	Audio Input 4	IFB 1
5	<input type="checkbox"/>	Audio Input 5	IFB 2
6	<input type="checkbox"/>	Audio Input 6	IFB 3
7	<input type="checkbox"/>	Audio Input 7	Office Sounds
8	<input type="checkbox"/>	Audio Input 8	Led Zeppelin
9	<input type="checkbox"/>	Audio Input 9	Feed 9

User Name	Display Name	User Selectable Progra	Allowed user program feeds							
Mike	Mike @ Unity	1-8	1	2	3	4	5	6	7	8
Bryan	Bryan	1,7-8	9	10	11	12	13	14	15	16
Chuck	Chuck @ Unity	1,7-9	17	18	19	20	21	22	23	24
Android	Android	1,7-9	25	26	27	28	29	30	31	32
			33	34	35	36	37	38	39	40
			41	42	43	44	45	46	47	48
			49	50	51	52	53	54	55	56
			57	58	59	60	61	62	63	64

*Note:*  
The User Name and Display Name are read-only in this table and cannot be edited

The bottom left of this screen contains a duplicate user list as configured on the *Users* page. Additionally, this table shows any user-selectable program feeds that have been configured. This will be explained further in the *Allowed User Program Feeds* section below.

The screen is divided into three sections. The top section shows all 64 possible program feed inputs, along with their physical source and a text description which is used by Unity 3 clients for program feed selection. The lower left section is a read-only display of each user, and the lower right portion shows the allowed program feeds for whatever

user is currently selected.

**Number** – This is a simple read-only number from 1-64 showing the available program feeds.

*Note:*  
*You are not required to specify  
a default program feed.*

**Default** – One of the program feeds can be designated the *default* program feed. This feed is available to every Unity user regardless of their individual program feed selections also configured on this page.

**Source** – For each of the 64 possible program feeds, you can specify where the audio originates from with the Source drop-down. These can come from any of the audio inputs from the preconfigured *Input Device* from the *General* page, or from any of the preconfigured channels set up in the *Channels* page.

**Program Feed Name** – This description is shown on the Unity client applications to make it easier to select from various program feeds.

**Allowed User Program Feeds - Note:** **this area is only enabled if you have purchased the Unity Advanced Program Feed upgrade.** This area specified what audio inputs can be used by each user as a user selectable program feed. You must first click on a preconfigured user in the user table located on the bottom left, then enable or disable each of the 64 possible input audio channels that the user can choose from.

A read-only version of the available program feeds can be seen in the user table under the *User Selectable Program Feeds* column. They can only be edited by clicking on the appropriate channels in the *Allowed User Program Feeds* area.

## Unity Settings - Tally/GPIO

Selecting the *Tally/GPIO* tab will display the following window. Note that you must either be in trial mode or have purchased the *Unity Tally License* or *Unity Online Status GPIO License* to use the features in this window.

The screenshot shows the 'Audivero Unity Settings' window with the 'Tally/GPIO' tab selected. The window title bar includes icons for General, Channels, Groups, Users, Audio Feeds, Tally/GPIO, Advanced, and Upgrades. The 'Tally/GPIO Interface Configuration' section contains the following fields:

- Tally Interface Type: TSL 3.1 (dropdown)
- GPIO Type: Unity Six Relay (dropdown)
- Tally IP Address: 192.168.128.6
- GPIO IP Address: 10.51.1.20
- Tally Port: 20110

Below the configuration fields is a table with the following data:

User Name	Display Name	Tally ID	GPIO	Talent
Mike	Mike @ Unity	1	N/A	<input checked="" type="checkbox"/>
Bryan	Bryan	2	N/A	<input type="checkbox"/>
Chuck	Chuck @ Unity	3	N/A	<input type="checkbox"/>
Android	Android	N/A	N/A	<input type="checkbox"/>

At the bottom of the window is a grid of 128 status indicators, numbered 1 through 128 in a 10x13 grid (with the last row containing only 8 indicators). All indicators are currently grey.

**Tally Status** — At the bottom of this screen you will find status indicators for the external tally interface (if the Unity Tally license has been purchased). These indicators will be grey if in the *Off* state, green if in *Preview* state, and red if

*On-Air.* These indicators are a good way to see if the tally inputs are working properly and which tally indicator corresponds to your particular tally station.

*Note:*  
If you are using a Blackmagic ATEM video mixer, Unity Server does NOT require a Blackmagic GPI/Tally interface.

**Tally Interface Type** – **Note: this field will only be enabled if you have purchased the Tally Interface upgrade.** Set this to the type of device that the Unity Server will communicate with to obtain external tally information. Currently there are eight choices: Unity Universal, Unity Universal 2-Stage, Blackmagic ATEM, Newtek TriCaster, vMix and TSL 3.1.

**Tally IP Address** – **Note: this field will only be enabled if you have purchased the Tally Interface upgrade.** This field should be set to the IP address of either the Unity Universal Tally Interface, or the IP address of a Blackmagic ATEM, Newtek TriCaster, or vMix video mixer. This field is not used by the TSL 3.1 interface. This will allow the Unity Tally feature to communicate with your video mixer to display either a red Program tally or a green Preview tally (if your mixer is equipped) on the remote Unity Client interface.

**Tally Port** - **Note: this field will only be enabled if you have purchased the Tally Interface upgrade.** This field is used only by the TSL 3.1 tally interface, and is the TCP port that the Unity Server will listen on for remote TSL tally information. By default this port is 20110, but can be set to any port number between 1 and 65535. This must match the TSL configuration specified on your video switcher.

**GPIO Type** - **Note: this field will only be enabled if you have purchased the Unity Online Status GPIO License.** This field specifies the type of the external GPIO device that is attached, and currently the only available interface is the *Unity Six Relay interface* (purchased separately). Each of the GPIO outputs will be triggered when users log in to the system, and turn off when they log out or otherwise leave the coverage area.

**GPIO IP Address** - **Note: this field will only be enabled if you have purchased the Unity Online Status GPIO License.** This field specifies the IP address of the remote *Unity Six Relay Interface*.

*Note:*  
The User Name and Display

The area of the window contains another copy of the user list as configured on the *Users* page, but with a few extra

Name are read-only in this table and cannot be edited.

configurable columns as explained below.

**Tally ID** – Each of the remote devices can receive tally information and show it on the display of their device. This drop-down field selects which of the tally inputs will be sent to each user. Using the screenshot above, if Chuck is operating Camera 1 and his camera is plugged into input 1 of the video mixer, then selecting *Tally ID* “1” will light his Unity app display when the video mixer is switched to video input 1. Select **N/A** if you do not wish to send tally information to the selected user’s device.

*Note:  
Using the Talent Tally feature will affect battery performance of the device. Consider local power for the device if using the Talent Tally for extended periods.*

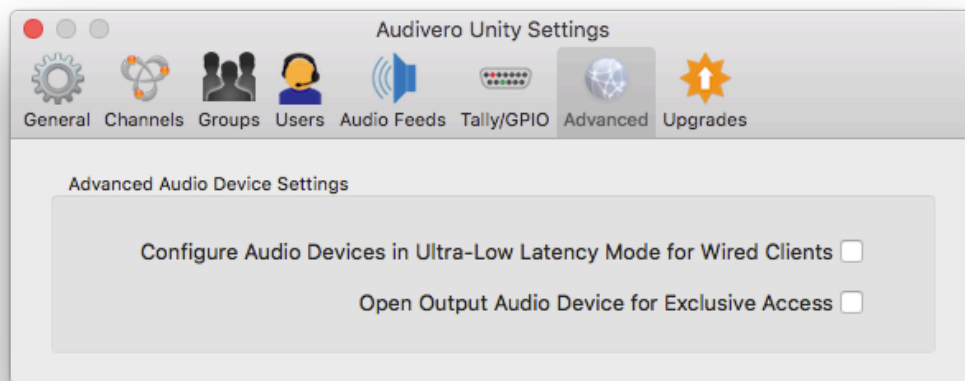
**Talent** – When the Tally ID is set to on and the Talent Tally checkbox is checked, the remote Unity device will illuminate the rear flash/LED when that device receives a tally signal. When you mount the device so that the rear of it can be seen from the talent position, this serves as an On-Air Tally light for the talent so they know which camera is live at any given moment. Note that this feature is not available on Windows, Mac or iPod Touch clients.

**GPIO** - This dropdown field selects the GPIO relay that is closed when a particular user is logged in. These inputs can be combined in an ‘**or**’ type of configuration. For example, you might configure three different users to all use GPIO relay number 1. What this implies is that if **any** of the three users is currently logged in, then GPIO relay number 1 would be closed.



## Unity Settings - Advanced

Selecting the *Advanced* tab will display the following window. These are features that allow additional hardware configuration and can impact CPU usage on the Mac computer running Unity Server.



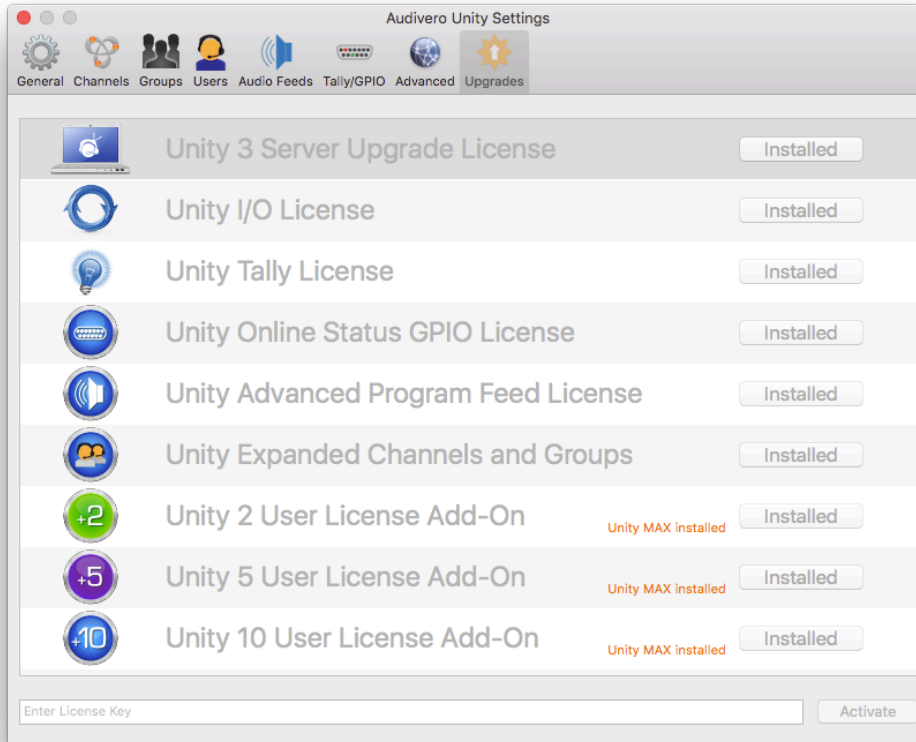
*Note:*  
Selecting this option may  
increase the Mac system CPU  
usage by up to 10%

**Configure Audio Devices in Ultra-Low Latency Mode for Wired Clients** — By selecting this option, the server will be configured to run at 4X the desired sample rate. This is to allow wired clients to run at much lower latencies (10ms end-to-end). This setting will have no effect on wireless clients such as IOS and Android clients.

**Open Output Audio Device for Exclusive Access** — Normally output audio devices are open in shared mode, which uses the Mac system audio mixer. This software mixer incurs a bit of latency in the output audio path (nearly 20ms worth of delay). By selecting this option, you can reduce the output delay by nearly 20ms. Note that this option will not reduce any latency if your output audio device is an aggregate audio device. This is due to the fact that aggregate audio devices by definition must use the system software audio mixer.

## Unity Settings - Upgrades

Selecting the Upgrades tab will display the following window:



**Note:**  
You must purchase a base 3 user license before adding any additional Unity licenses.

**Unity Base 3 User License** – A Unity base license is required for the Unity Server to operate beyond the trial period. This may be indicated as a *Unity 3 Server License* or a *Unity 3 User Upgrade License*, depending on whether or not this is an existing Unity 2 installation. No other licenses can be installed without a Unity 3 Base License.

**Unity I/O License** – This upgrade allows you to send Unity audio streams to or receive external audio streams from audio devices. Using this feature you can integrate a Unity intercom system with other intercom systems from manufacturers like ClearCom or Telex/RTS. This will allow you to use a Unity system to provide a wireless com station in combination with the hard-wired system without the expense of RF wireless systems.

**Note:**  
You do not have to purchase the Blackmagic GPI/Tally

**Unity Tally License** – This enables the Unity Server to receive external tally input from a video mixer. Unity Server provides both Preview and Program tally if the connected

*interface with the Unity system.* video mixer supports this feature.

**Unity Online Status GPIO License** – This enables an external relay closure device (available separately) to be triggered each time a user logs in to the Unity system remotely. Great for external LED or incandescent ‘online’ indicators.

**Unity Advanced Program Feed License** – Allows Unity clients to select individual program feed sources and optionally assign them to left, right or a combination of both ears while using a headset. Helps keep normal communication traffic separate from program feed audio resulting in greater comprehension.

***Note:**  
During trial mode operation, the Unity server will allow you to configure as many groups and channels as you like. When trial mode expires, the system will roll back to 6 channels and one group maximum.*

**Unity Expanded Channels and Groups** – By default, Unity allows you to configure up to 6 channels and one group. This license allows you to configure up to 64 groups and 128 channels.

***Note:**  
If you’ve purchased a Unity Max license, the maximum number of users that can be configured is unlimited. However there is a practical limit on the number of users that can be configured, depending on CPU speed and actual intercom usage.*

**Unity User Licenses** – Add-on licenses are available in 2, 5 and 10 user quantities and can be purchased up to a maximum of 63 users. Any number of users can be created in the Unity Server but you can only enable the number of users that you have licensed.