iPlay

Network Audio Stream Player

Document Version 1.0, Jan 2009
iPlay Versions 1.0.x

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This product is covered by a 90-day limited warranty, the full text of which is included in Appendix B of this manual.

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Feedback is welcome

At Axia, we love to hear your feedback. If you find anything in this manual that you feel needs clarification or correction, please let me know: e-mail cnovak@AxiaAudio.com .

About This Manual

This manual covers setup and use of Axia iPlay software. It is assumed in this document that you are familiar with Livewire's basic concepts, as outlined in the companion *Introduction to Livewire: Systems Primer*.

If you have not done so, please review that material first. In it we explain the ideas that motivated Livewire and how you can use and benefit from it, as well as nitty-gritty details about wiring, connectors, and the like. Since Livewire is built on standard networks, we also help you to understand general network engineering so that you have the full background for Livewire's fundamentals. After reading *Introduction to Livewire* you will know what's up when you are speaking with gear vendors and the network guys that are often hanging around radio stations these days.

As always, we welcome your suggestions for improvement. Contact Axia Audio with your comments:

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A Note From The President of Telos

It's been a tradition since Telos' very first product, the Telos 10 digital phone system, that I share a few words with you at the beginning of each manual. So here goes.

In radio broadcast studios we're still picking up the pieces that have fallen out from the digital audio revolution. We're not using cart machines anymore because PCs are so clearly a better way to store and play audio. We're replacing our analog mixing consoles with digital ones and routing audio digitally. But we're still using decades-old analog or primitive digital methods to connect our gear. Livewire has been developed by Telos to provide a modern PC and computer network-oriented way to connect and distribute professional audio around a broadcast studio facility.

Your question may be, "Why Telos? Don't you guys make phone stuff?" Yes, we certainly do. But we've always been attracted to new and better ways to make things happen in radio facilities. And we've always looked for opportunities to make networks of all kinds work for broadcasters. When DSP was first possible, we used it to fix the ages-old phone hybrid problem. It was the first use of DSP in radio broadcasting. When ISDN and MP3 first happened, we saw the possibility to make a truly useful codec. We were the first to license and use MP3 and the first to incorporate ISDN into a codec. We were active in the early days of internet audio, and the first to use MP3 on the internet. Inventing and adapting new technologies for broadcast is what we've always been about. And we've always been marrying audio with networks. It's been our passion right from the start. In our genes, if you will. As a pioneer in broadcast digital audio and DSP, we've grown an R&D team with a lot of creative guys who are open-eyed to new ideas. So it's actually quite natural that we would be playing marriage broker to computer networks and studio audio.

What you get from this is nearly as hot as a couple on their wedding night: On one RJ-45, two-way multiple audio channels, sophisticated control and data capability, and built-in computer compatibility. You can use Livewire as a simple sound card replacement – an audio interface connecting to a PC with an RJ-45 cable. But add an Ethernet switch and more interfaces to build a system with as many inputs and outputs as you want.

Audio may be routed directly from interface to interface or to other PCs, so you now have an audio routing system that does everything a traditional "mainframe" audio router does – but at a lot lower cost and with a lot more capability. Add real-time mixing/processing engines and control surfaces and you have a modern studio facility with many advantages over the old ways of doing things. OK, maybe this is not as thrilling as a wedding night – perhaps kissing your first lover is a better analogy. (By the way, and way off-topic, did you know that the person you were kissing was 72.8% water?)

While were on the subject of history… you've probably been soldering XLRs for a long time, so you feel a bit, shall we say, "attached" to them. We understand. But no problem – you'll be needing them for microphones for a long while, so your withdrawal symptoms won't be serious. But your facility already has plenty of Ethernet and plenty of computers, so you probably already know your way around an RJ-45 as well. It's really not that strange to imagine live audio flowing over computer networks, and there's little question that you are going to be seeing a lot of it in the coming years.

The 20th century was remarkable for its tremendous innovation in machines of all kinds: power generators, heating and air conditioning, cars, airplanes, factory automation, radio, TV, computers. At the dawn of the 21st, it's clear that the ongoing digitization and networking of text, audio, and images will be a main technology story for decades to come, and an exciting ride for those of us fortunate to be in the thick of it.

Speaking of years, it has been a lot of them since I wrote the Zephyr manual intro, and even more since the Telos 10 – almost 20 years now. Amazing thing is, with all the change around us, I'm still here and Telos is still growing in new ways. As, no doubt, are you and your stations.

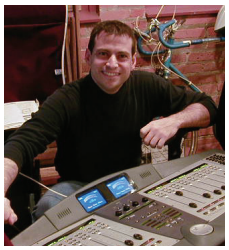
Steve Church, January 2004

A Note From The President of Axia

Nearly 20 years ago, I designed my first broadcast console for PR&E. I look back on that time with great fondness; we were building bullet-proof boards for the world's most prestigious broadcasters, making each new console design bigger and fancier to accommodate a wider variety of source equipment and programming styles. The console was the core of the studio; all other equipment was on the periphery.

Then things changed: the PC found its way into broadcast audio delivery and production. At first, PC audio applications were simple, used only by budget stations to reduce operating expenses. But soon the applications evolved and were embraced by larger stations. Slowly, the PC was taking center stage in the radio studio.

Like many, I was captivated by the PC. Stations retired carts, phonographs, open-reel decks, cassettes — even more modern digital equipment such as DAT and CD players, replacing all with PC apps. Client/server systems emerged and entire facilities began using PCs to provide most – or all – of their recorded audio. Yet consoles continued to treat PCs as nothing more than audio peripherals. I knew that we console designers were going to have to rethink our designs to deal with computer-centric studios.



During this time, traditional broadcast console companies began producing digital versions. But early digital consoles were nearly identical in form and function to their analog predecessors. It took a fresh look from a European company outside broadcasting to merge two products – audio routing switchers and broadcast consoles – into a central processing engine and attached control surface. Eventually nearly every console and routing switcher company followed suit, and a wide variety of digital "engines" and control surfaces flooded the market.

But, advanced as these integrated systems were, they still handled computer-based audio sources like their analog ancestors. Sure, the router and console engine were now integrated, but the most important studio element – the PC – was stuck in the past, interfaced with 100-year-old analog technology. The PC and console couldn't communicate in a meaningful way – strange, considering that PCs everywhere were being networked, fast becoming the world's most popular and powerful communication tool.

Then a group of Telos engineers developed a method of using Ethernet to interconnect audio devices, allowing computers and consoles, controllers and peripherals to interact smoothly and intelligently. Powerful, flexible networks had finally come to our studios. As with the transition from carts to computers, the benefits are many and impressive. A few networked components can replace routing switchers, consoles, processing peripherals, sound cards, distribution amps, selector switches and myriad related devices.

This deceptively simple networked system costs a fraction of other approaches, yet has capabilities surpassing anything else. The system is modular and can be used to perform discrete functions in a traditional environment. Concurrently, it easily scales to serve both the humblest and the very largest of facilities. Console, router, and computer work in harmony.

So, equipped with this new technology and countless ideas, we launch *Axia*, the newest division of Telos. *Axia* is all about delivering innovative networked audio products to future-minded broadcasters. On behalf of our entire team, I welcome you as a charter client. Axia is the culmination of nearly 40 man-years of some of the most ambitious R&D ever applied to the radio industry. And this is only the beginning. We have more products, innovations, and partnerships in the pipeline.

You already know your Axia system is unlike anything else. So it shouldn't be surprising that your new system is loaded with new thinking, new approaches, and new ideas in virtually every conceivable area. Some concepts will challenge your traditional ideas of studio audio systems, but we're certain that once you have experienced the pleasures of the networked studio, you'll never want to go back. And now, for something completely different...

Michael "Catfish" Dosch, February 2004

TCP/IP,

How did we live without thee?

Analogicly.

Chapter One:

Introduction and Installation

Introduction

Axia iPlay is a software interface between your Livewire network and your Windows PC audio device. It provides a way to listen to Axia audio streams without the installation of Axia's IP audio driver. iPlay is used in cases where a user does not need to add any new audio streams to the network. iPlay is designed to provide economical "listen-only" capability where it is needed.

iPlay includes the following functions:

- Automatic detection of Livewire sources.
- User friendly interface that allows filtering and sorting Livewire channels making it easy to navigate in big systems containing hundreds Livewire channels.
- Preset buttons that allow quick access to eight pre-selected channels.
- Playback of Livewire audio sources.
- Restricted access by use of Access Control Lists.

A Livewire system incorporates at least two types of audio streams. **Standard Streams** are best suited to iPlay since Windows can handle this type of stream without difficulty. The ability to preview or play Livestreams is highly dependent on the available resources and performance of your PC. Many iPlay users can preview **Livestreams** with no problems.

Axia iPlay 1.0.x supports the following Operating System platforms:

- Microsoft Windows 2000 Professional
- Microsoft Windows XP Professional Edition (32-bit, standard)
- Microsoft Windows XP Home Edition
- Microsoft Windows 2003 Server R2

Installing iPlay

If you are running a recent version of your Windows operating system, or have installed the latest service pack from Microsoft, your installation will go smoothly. In the rare cases where the installer gives an error message indicating that the installer is outdated, you must update your operating system using Microsoft's update service. It is generally considered good practise to install the latest service pack from Microsoft.

Note that iPlay is licensed for each individual installation and a unique key will be required each time you install iPlay.

To install the Axia iPlay follow these steps:

1. Insert your Axia iPlay CD. If auto-play is disabled, you can browse the CD and double-click *Axiaiply.Msi* to start the installation process. Use *NEXT* button to proceed with the installation.

Figure 1-1: Installation Wizard

2. Review and accept the conditions of the End Users License Agreement - shown in Figure 1-2 on the following page.

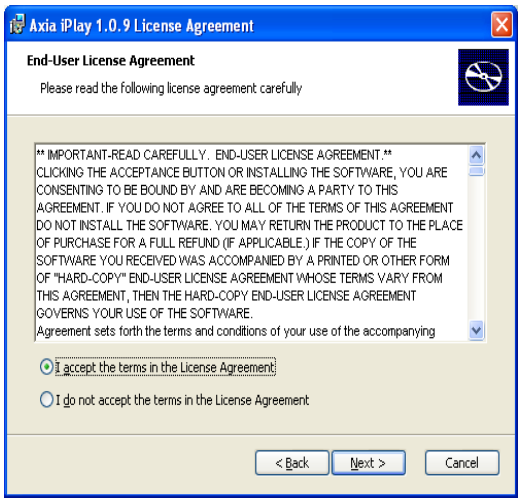


Figure 1-2: License Agreement

3. Choose the desired installation. “Typical” setup is recommended and acceptable for most users.

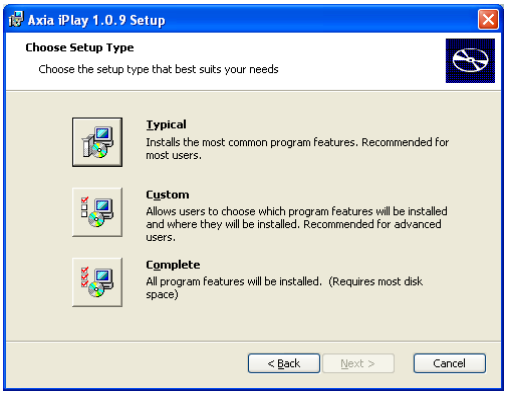


Figure 1-3: Installation Type

4. You will be prompted for your license number and license key. Enter this information and press *OK* to proceed with the installation

Figure 1-4: iPlay Registration

All iPlay license numbers and keys are intended for “single-user” licensing and are unique for each iPlay installation.

5. Select *Finish* to complete the installation and proceed with configuration described on the next page.

Removing Axia iPlay 1.0.x

1. From the Windows Control Panel, launch the *Add-Remove Programs* .
2. Select Axia iPlay, and click “Remove”.
3. All components installed in your system will be removed automatically

Configuring Axia iPlay

Axia iPlay requires very minimal configuration. All you need to do is select the network card connected to your Livewire network. If your PC has only one network card, no configuration should be necessary. Note that the network adaptor should be wired as opposed to a wireless adaptor. Livewire audio streams require more bandwidth than that provided by most wireless connections.

Basic Configuration

In a small network with only a few studios, no special configuration is required.

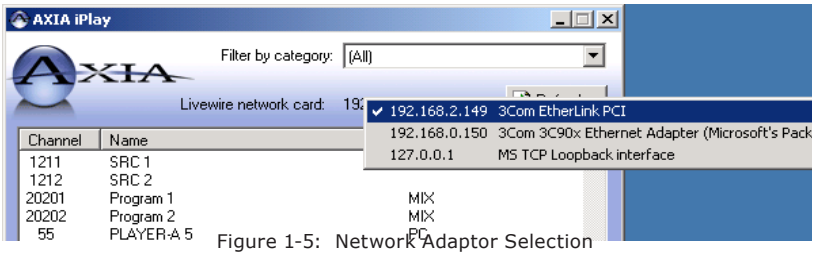


Figure 1-5: Network Adaptor Selection

To begin, simply start iPlay. If you have multiple network adaptors and if the IP address shown at the top of the window does not correspond to the network card connected to your Livewire network, click on it, and a selection list will pop-up as shown in Figure 1-5.

As soon as appropriate network interface is selected, Livewire channels should appear on the list. There may be a few seconds delay before they are detected since Livewire sources are advertised approximately every 10 seconds.

The basic configuration will give iPlay users access to all Livewire channels in your network. If you wish to restrict access - read on! That information is contained in the following section.

Access Control List

In a larger network with several studios, it may be desirable to restrict the sources available to various iPlay users. This will make iPlay easier to use since only the relevant sources will be available to users. A large installation will have several hundred audio streams and it can be very tedious to scroll through such a long list even though the sources may be categorized. In addition, it is often desirable to limit iPlay stream access for privacy reasons.

iPlay (version 1.0.7 or later) has provision for an access control list that may be implemented in two different ways. The first is by means of a direct registry edit. This is done by adding a specific key that contains the access control list information. The second technique also involves a registry edit however in this case, an external ACL (access control list) file is referenced. Each method has its advantages. We will discuss these two scenarios below.

A registry entry can be created in HKEY_LOCAL_MACHINE\SOFTWARE\Telos Systems\Axia iPlay. This new entry will be a string value named ACL. The data for this new key will consist of a list of specific Live wire source channel numbers and ranges. A basic example looks something like the example shown in Fugure 1-6

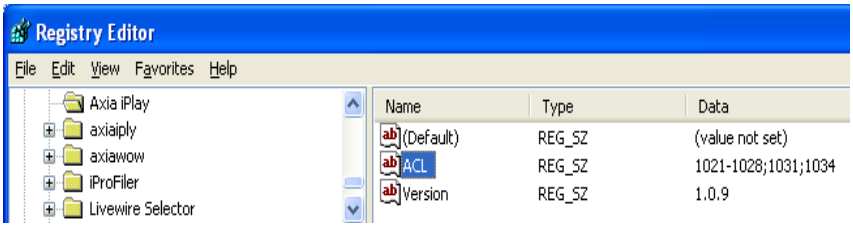


Figure 1-6: Registry Key Configuration

In this example, we are allowing the iPlay user to access only channels 1031, 1034 and the range of 1021 through 1028. The channels and ranges can be anything you choose. Note that all users on a specific machine will be limited by this ACL.

Another way to accomplish access control is to create an ACL file that can be located locally or on a server, and then reference that file in the registry. In the example shown in Figure 1-7, we have created an ACL file named **iplay_ACL.txt**. This file is referenced in the registry by creating a registry key in a similar manner as outlined above however instead of listing the ACL right in the registry, we specify the location and name of the external ACL file. The data of the registry key will be in the format of **file://\\[server]\[share]\[ACL file name]**. The server may be specified by using its name or IP address. Since it is the purpose of the ACL to provide a level of security, a server location with controlled permissions is recommended.

The ACL file itself is a plain text file. An example of a basic ACL file is shown below where we have specified two channel ranges and two individual channel numbers. You can make this access control file as simple or complex as you wish. The order of the entries in the list is of no significance. Comments in the ACL file are preceeded by a semi-colon character.

```
; i-Play Access Control List
; List permitted channels and ranges below
allow 1038
allow 1035
allow 1021-1028
allow 11101-11105
```

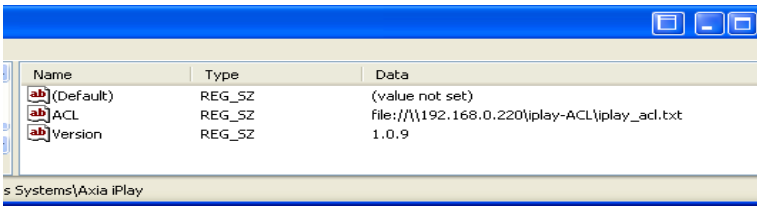


Figure 1-7: ACL File Setup

The results of using an ACL like this are shown in FIgure 1-8. You can see that the number of sources presented to the user is small. The user does not have access all sources in the Livewire network or even to sources outside a specific studio.

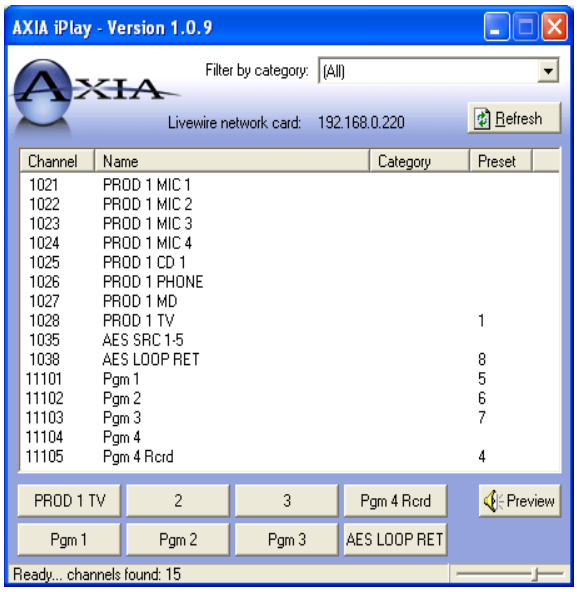


Figure 1-8: iPlay with ACL in effect

An example where limited access might be helpful is in the case of a News workstation. You may wish to give that user access to all satellite and TV audio feeds and possibly your studio PGM 1 feeds and block the user from all raw microphone feeds and other in-studio sources.

The implementation of the ACL feature is a powerful tool for ensuring the privacy of your employees.

Chapter Two:

Operation: Using iPlay

What is iPlay?

iPlay is a tool used for monitoring Livewire audio streams on a standard Windows PC. iPlay will use the default Windows playback device for this purpose. In order to use iPlay, it is necessary to have a network connection directly to the Axia LAN, not just to your Pathfinder server via the "office LAN". In some cases, it may be necessary to have dual NIC's in your PC if you wish to connect to multiple LANs.

General View

The active Livewire channel list is displayed and dynamically updated as new sources are discovered or unused sources are deleted.

Note that new sources will always appear at the end of the list regardless the sort order. If a channel name has been updated, its position on the list will not change regardless the sort order.

You may click **Refresh** to update the view and correct the order of new sources and to eliminate recently deleted sources.

Sorting and Searching

The Livewire channel source list can be sorted by Channel Number, Name or Category. In a manner familiar to most Windows users, simply click the appropriate column header of the list to change the sort order. To see your sources listed in order of their name, click on the **Name** column header. To sort your list by Category, click on the **Category** column header .

While it is useful to sort your source list in various sort orders as described above, it is probably much more useful to define caregories as described in the next section. This way you can list only those sources that belong to a specific group or category and get a small, user-specific list in a couple of clicks.

Some illustrations of the sort and search feature are provided in the following topics.

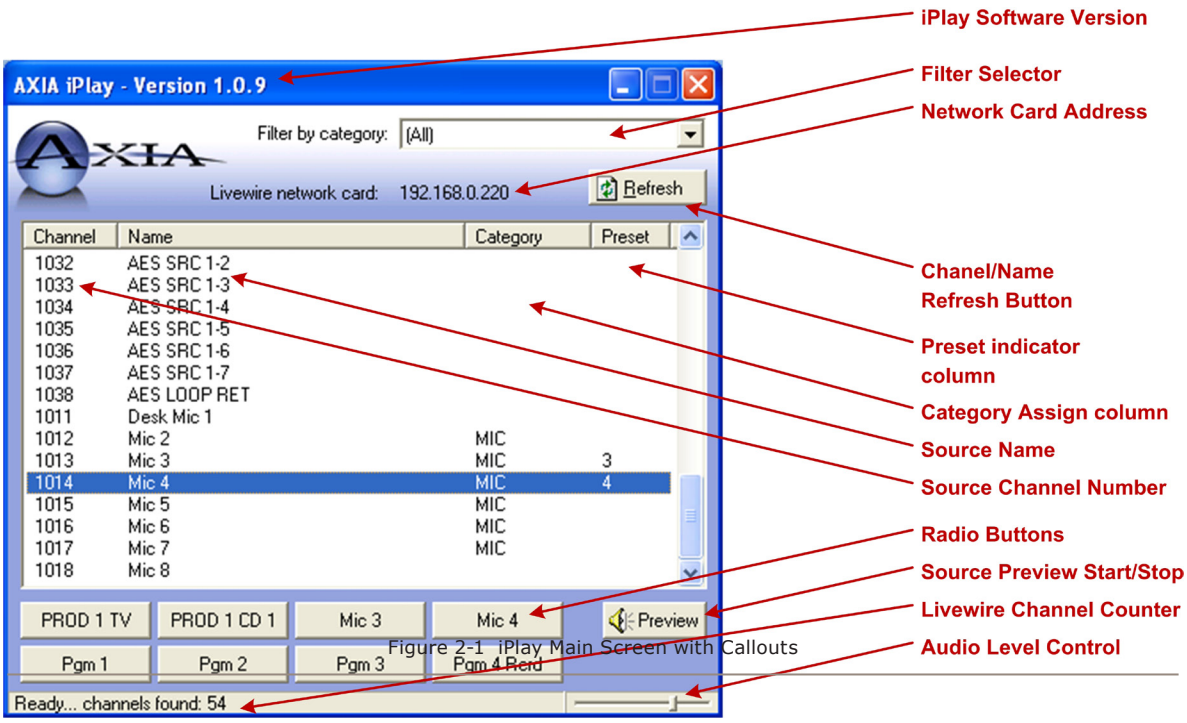


Figure 2-1 iPlay Main Screen with Callouts

Presets

The user can assign sources to 8 radio buttons and use them in a manner similar Axia's Router Selector node. To assign preset buttons, you can use one of the following methods:

- Click in "Preset" column across from your source of interest and the type radio button number (1 through 8) or select the desired preset button number from the drop-down list.
- Drag and drop the channel on one of radio buttons: Select a channel on the list, push left mouse button down, move cursor over a radio button and release the mouse button.

Since there are eight preset buttons, your are naturally limited to having 8 presets per installation. It is possible, however to Preview any stream without assigning it to a preset. Use presets for your 8 favorite audio sources.

Figure 2-2: Assigning iPlay Presets

To change a Preset button, simply assign or drag/drop a new source to that Preset button

Assigning Categories to Channels

To assign a category to a channel, click on the list in the "Channel" column to select or type a name. If you type a name that did not exist, a new category will be automatically created and it will appear in the filter drop down list.

To clear category assignments, simply clear the text in the edit area.

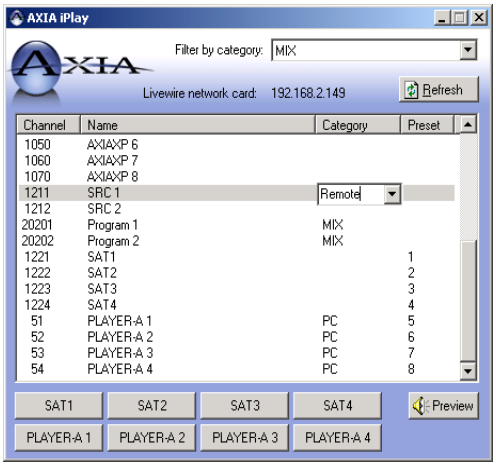


Figure 2-3: Assigning iPlay Categories

Categories are assigned locally on each iPlay workstation. This provides a great deal of flexibility for your users and makes iPlay very fast to use, even in a large network.

Filtering by Category

Categories are locally assigned by the user to help quickly locate sources. All category names that are in use will appear in the filter drop down box shown below. To restrict your view to a specific category of sources, simply click the category drop-down and select the desired category. The souce list is immediately updated with the new category filtering applied and you will see only the sources that belong to the category you have selected.

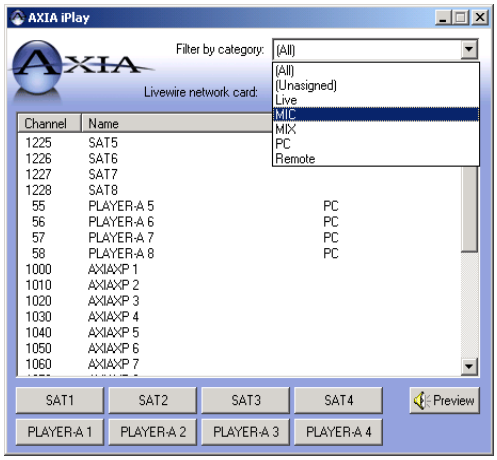


Figure 2-4: Filtering by Category

Once you have applied a filter, the list of sources might look like Figure 2.5. You still have the same 8 preset buttons and now you have another specific list of sources that you may preview.

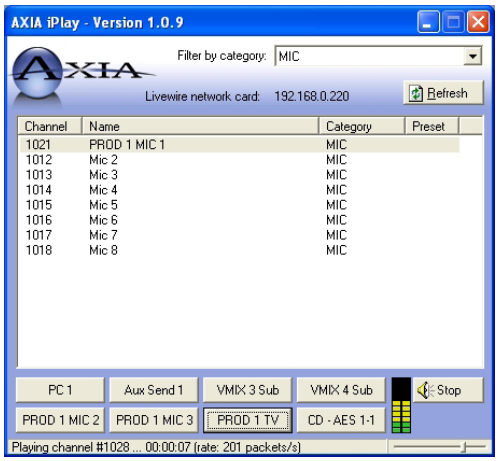


Figure 2-5: Filtered List of Sources

Preview

This is the single function of iPlay that you will use the most. It is very quick since many of the other features of iPlay are designed to make this one really fast and easy.

To quickly preview a source, select it on the list and click **Preview**. The preview button changes to **Stop** as soon as the audio preview begins. Use this same button to stop the audio preview.

To play a channel assigned to a radio preset button, simply click appropriate radio button.

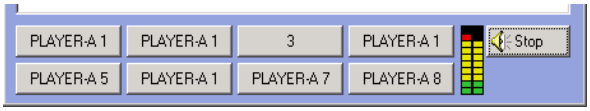


Figure 2-6: Previewing an Audio Stream

While playing back, an audio level meter is visible. This meter shows the peak value. Yellow segments indicate the nominal operating range from –38dBFS to –20dBFS.

To impress your friends, you can also point out how many packets per second are being processed by iPlay. This information is displayed on the small status bar at the bottom of the window below the preset buttons. As a matter of interest to the geek in all of us, a Livestream is approximately 4000 packets per second and a Standard Stream is 200 packets/sec.

Cheap network printer:,

Works great but rage flares brightly;

Toner bill just came..

Appendix A: Livewire Ports

Standard ports are used for specific functions within the Livewire system. Here is a summary of the ports and their use. If you have installed an Axia application with your Windows firewall enabled, the applications and ports will be automatically added to your Windows firewall exceptions. If your installation has been performed with the Windows firewall disabled and you have subsequently enable the firewall, you may have to perform some tweaking of the firewall to get things operating normally. This information will be helpful in that case or in the event that you are using some other firewall.

Port	Protocol	Use
67,68	UDP	BOOTP Server/Client
		- Remote IP address assignment
93	TCP	Livewire Routing Protocol
123	UDP	NTP
514	UDP	Syslog logging
2055	UDP	Multicast based GPIO (CMsg2 protocol) (mcast on 239.192.255.4)
		- GPIO commands from GPIO node to console-type endpoint
2060	UDP	Multicast based GPIO (CMsg2 protocol) (mcast on 239.192.255.4)
		- GPIO commands from console-type endpoint to GPIO node
4000	UDP	Livewire Advertisement and Source Allocation Protocol
		- Full info advertisement requests and source allocation requests
4001	UDP	Livewire Advertisement and Source Allocation Protocol (mcast on 239.192.255.3)
		- Periodic announcements and full info advertisements
		- Source allocation state announcements and responses
4002	UDP	Engine supervision protocol (mcast on 239.192.255.3)
4010	TCP	Livewire Control Protocol
4011	UDP	LWCP for Accessory Modules (from module to console) (mcast on 239.192.255.4)
4012	UDP	LWCP for Accessory Modules (from console to module) (mcast on 239.192.255.4)
5004	UDP	RTP Livewire Audio
7000	UDP	Livewire Clock
9997	TCP	Protocol logging (for debug) in Element

Appendix B: Warranty

Axia Audio Limited Warranty

This Warranty covers “the Products,” which are defined as the various audio equipment, parts, software and accessories manufactured, sold and/or distributed by TLS Corp., d/b/a Axia Audio (hereinafter “Axia Audio”).

With the exception of software-only items, the Products are warranted to be free from defects in material and workmanship for a period of five (5) years from the date of receipt by the end-user. Software-only items are warranted to be free from defects in material and workmanship for a period of 90 days from the date of receipt by the end-user.

This warranty is void if the Product is subject to Acts of God, including (without limitation) lightning; improper installation or misuse, including (without limitation) the failure to use telephone and power line surge protection devices; accident; neglect or damage.

EXCEPT FOR THE ABOVE-STATED WARRANTY, AXIA AUDIO MAKES NO WARRANTIES, EXPRESS OR IMPLIED (INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE).

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In order to invoke this Warranty, notice of a warranty claim must be received by Axia Audio within the above-stated warranty period and warranty coverage must be authorized by Axia Audio. If Axia Audio authorizes the performance of warranty service, the defective Product must be delivered, shipping prepaid, to: Axia Audio, 2101 Superior Avenue, Cleveland, Ohio, USA 44114.

Axia Audio at its option will either repair or replace the Product and such action shall be the full extent of Axia Audio’s obligation under this Warranty. After the Product is repaired or replaced, Axia Audio will return it to the party that sent the Product and Axia Audio will pay for the cost of shipping.

Axia Audio’s authorized dealers are not authorized to assume for Axia Audio any additional obligations or liabilities in connection with the dealers’ sale of the Products.

Axia Audio’s products are to be used with registered protective interface devices which satisfy regulatory requirements in their country of use.


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