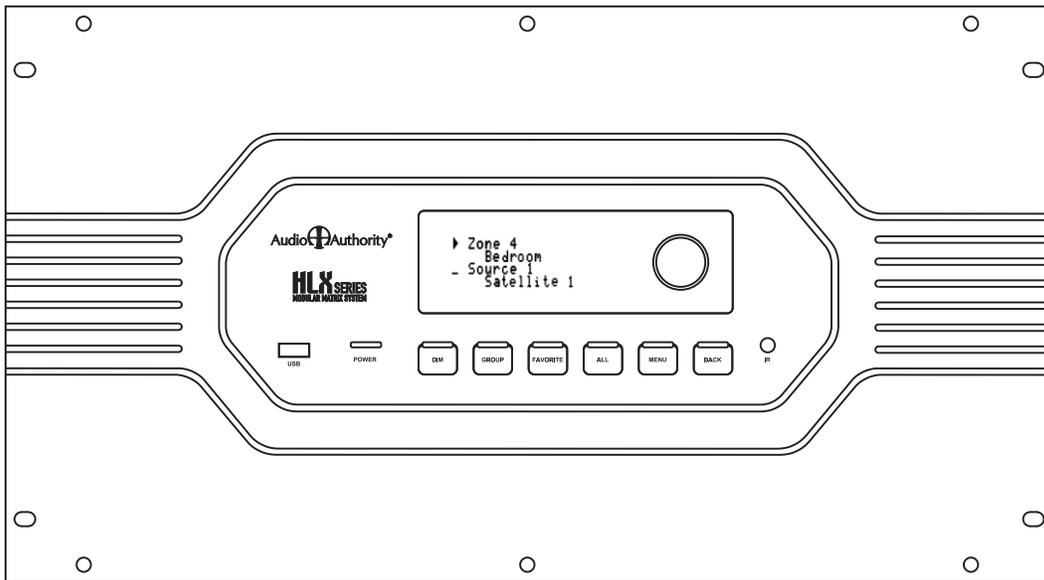


Installation and Operation

HLXTM SERIES MODULAR MATRIX SYSTEM



High Definition Video/Audio Switching System

Audio  Authority[®]

WARNING:

To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

**CAUTION**
RISK OF ELECTRIC SHOCK
ATTENTION RISQUE DE CHOC ELECTRIQUE

The lightning flash within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.



The exclamation point symbol within the eight-sided shape alerts users to important operating and maintenance instructions in this booklet.

AVERTISSEMENT:

Pour réduire les risques d'incendie ou de choc électrique, ne pas exposer cet appareil à la pluie ni à l'humidité.

**CAUTION**
RISK OF ELECTRIC SHOCK
ATTENTION RISQUE DE CHOC ELECTRIQUE

L'éclair terminé d'une flèche à l'intérieur d'un triangle indique à l'utilisateur la présence à l'intérieur de l'appareil d'une tension dangereuse non isolée ayant une amplitude suffisante pour provoquer une électrocution.

Le point d'exclamation à l'intérieur d'un triangle indique que des instructions de fonctionnement et d'entretien importantes sont détaillées dans les documents fournis avec l'appareil.



Le point d'exclamation à l'intérieur de l'octogone indique à l'utilisateur que des importantes instructions d'opération et d'entretien sont incluses dans ce document.

- Read these instructions.
 - Keep these instructions.
 - Heed all warnings.
 - Follow all instructions.
 - This product must be installed by qualified personnel.
 - Do not open the cover—there are no user-serviceable parts inside.
 - Do not use this apparatus near water.
 - Clean only with dry cloth.
 - Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
 - Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
 - Do not defeat the safety purpose of the grounding-type plug. If the provided plug does not fit into an outlet, consult an electrician for replacement of the obsolete outlet.
 - The power cord is used as a disconnect device; it shall remain readily operable. Do not prevent cord from being unplugged from apparatus.
 - Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where it exits from the apparatus.
 - Use only attachments/accessories specified by the manufacturer.
 - Unplug this apparatus during lightning storms or when unused for long periods of time.
 - Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- Lire toutes les directives avant de mettre l'appareil en opération.
 - Conserver les directives de sécurité et d'utilisation pour future consultation.
 - Tenir compte des avertissements.
 - Suivre les directives.
 - Ce produit doit être installé par un personnel qualifié.
 - Afin d'éviter tout risque d'électrocution, ne pas retirer le capot ou la couvercle. Aucune des pièces intérieures n'est réparable par l'utilisateur. Pour toute réparation, s'adresser à un technicien d'entretien qualifié.
 - Ne pas utiliser cet appareil près de l'eau.
 - Nettoyer seulement avec un chiffon sec.
 - Les ouvertures et fentes dans le châssis sont prévues pour la ventilation de l'appareil. Ces ouvertures ne doivent pas être bloquées. Installer conformément aux directives du fabricant.
 - L'appareil doit être situé loin de sources de chaleur telles que des radiateurs, des registres de chaleur, des fourneaux, ou d'autres appareils produisant de la chaleur.
 - Ne pas modifier le dispositif de sécurité de la fiche ayant une broche de mise à la terre. S'il est impossible d'insérer la fiche dans la prise de courant, contacter un électricien pour remplacer la prise de courant.
 - Le cordon d'alimentation est utilisé comme un dispositif de déconnexion; Il doit rester aisément fonctionnel. Ne pas prévenir le cordon d'alimentation de démonter de l'appareil.
 - Les cordons d'alimentation devraient être disposés de façon à ce qu'on ne puisse pas marcher dessus ou qu'ils soient susceptibles d'être coincés par des articles placés sur ou contre eux. Une attention particulière doit être portée aux fiches, prises de courant, et aux points où ils sortent de l'appareil.
 - Utiliser seulement les attachments et accessoires recommandés par le fabricant.
 - Débrancher l'appareil de la prise d'alimentation pendant un orage électrique ou une absence d'utilisation prolongée.
 - Confier tout entretien à un personnel de service qualifié.
 - Un service d'entretien est nécessaire quand l'appareil ne fonctionne pas normalement en suivant les consignes d'utilisation, quand le cordon d'alimentation ou sa fiche sont endommagés, quand des objets sont tombés dans l'appareil, quand du liquide y a été renversé, ou quand l'appareil a été exposé à la pluie ou à l'eau.



Installation and Operation Manual

This document is consistent with HLX configurations that include the following source and zone card models: 2114, 2124, 2174, 2214, 2248, and 2278, with features in firmware version 2.0.1.

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HLX SERIES

MODULAR MATRIX SYSTEM

Introduction

The HLX modular matrix system is designed to be easy to configure, control, and customize for a wide range of audio/video or audio only applications. Configure your HLX at www.audioauthority.com/hlx_config. It features an open control architecture (IR, serial and Ethernet), a flexible array of video and audio inputs/outputs, advanced digital signal processing, and an ultra-wide bandwidth backplane which enables large matrix systems with no loss in signal quality.

General HLX Features

- From 4 to 12 video sources with audio
- Four additional audio-only sources (16 sources total)
- From 4 to 64 zones (depending on card combination)
- Compatible with Ethernet, RS-232 serial, front panel IR, rear panel IR control signal input
- Source and zone cards feature pathways for IR control signals originating in the zones to control the HLX and to be passed through to the sources.
- Durable, easy to clean touch-sensitive front panel
- Supports component video, composite video, analog audio, digital audio and IR signals
- Supports HD video resolutions up to 1080p*
- Cross-converts** digital audio formats – digital coax and optical inputs are converted and output in both formats simultaneously
- Breakaway switching allows zones to select an audio source independent of the video source
- Modular card cage design for maximum flexibility
- Heavy duty, rack mountable, all metal construction
- Rack Unit height: Model 2006=6 RU, Model 2014=4 RU
- Designed and built in Lexington, KY, USA

Benefits for the Installer

- Drivers are available for major control systems
- Open control architecture compatible with any serial or Ethernet control system
- IR codes available for use with control systems including Control 4, Logitech Harmony, and URC
- LAN control via telnet (see serial commands)
- ZQ™ 10-band equalization and balance per audio zone
- Cat 5 bus includes power for the zone receiver and an IR pathway for control signals from each zone***
- Delivers component video up to 1080p*, digital and analog audio*** to zone receivers over Cat 5e/6 cables
- Optimize picture quality at each zone location with our exclusive Active Gain Equalization (AGE) technology
- Five different Cat 5 receiver styles are available***
- Unique IR signal routing allows discrete control of multiple sources of the same brand from different zones
- Efficient setup via PC application (free download)
- Permanent viewing restrictions on any number of zone/source combinations
- Locking front panel controls can prevent tampering
- Internal, UL approved power supply

Benefits for the User

- Excellent video quality up to 1080p*
- Excellent sound quality with customizable ZQ™ 10-band equalization per audio zone
- Volume control per zone via the centralized control system
- Any viewer can restrict other zones from viewing and/or controlling his or her source (expires after 5 hours)
- Content in each zone can be monitored and controlled from the HLX front panel interface

* Many sources do not support 1080p output on component video; they may offer 1080p only on copy protected, digital video outputs. Similarly, some TVs are not capable of displaying 1080p, even if they accept 1080p signals.

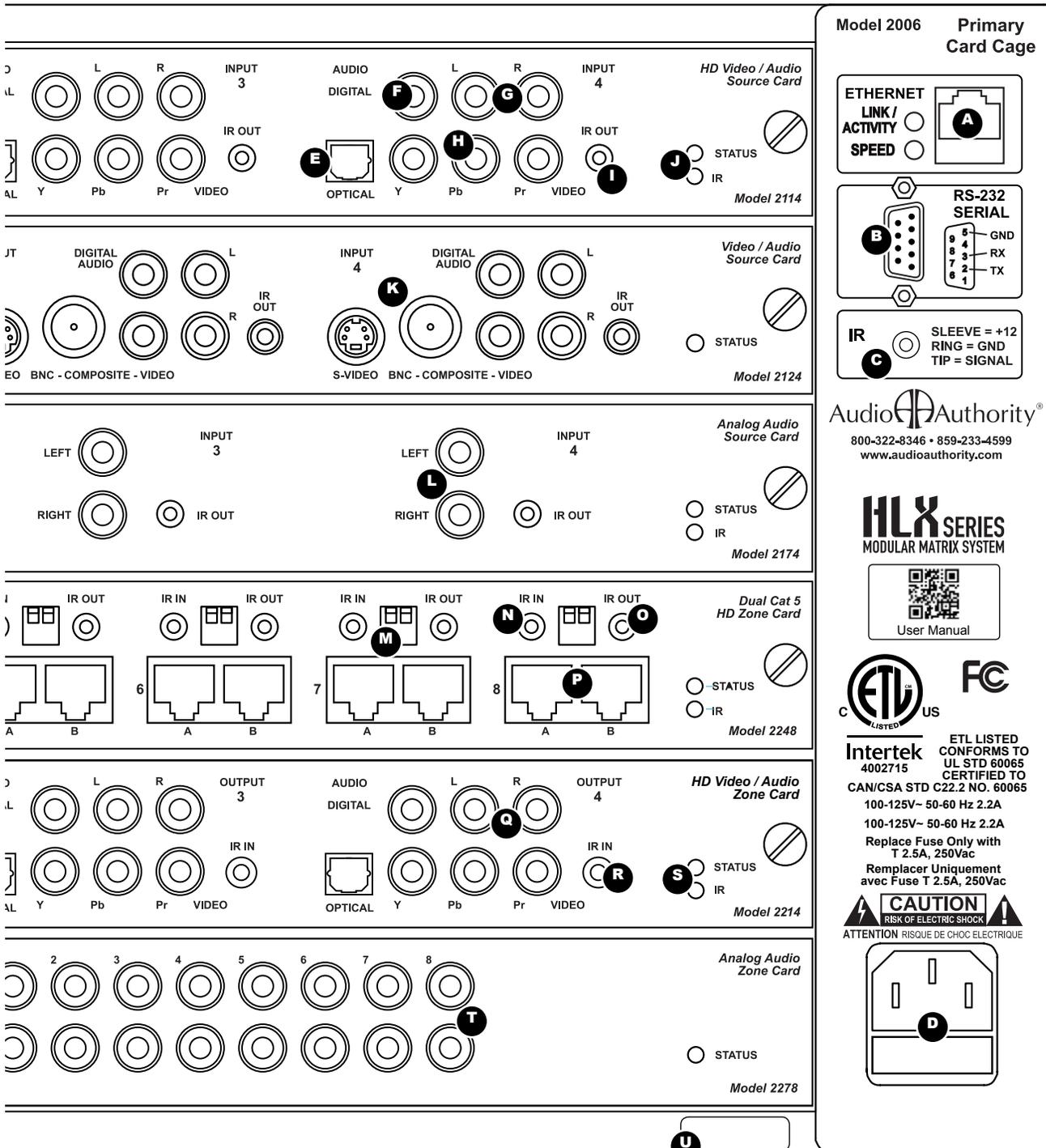


** Digital audio inputs are not converted to analog outputs, or vice versa.

*** When using the 2248 Zone Card, the analog audio and IR pathways are only available using dual Cat 5 receivers. IR must be wired separately when used in a Single Cat 5 receiver zone (see page 10 for details).

Rear Panel Features

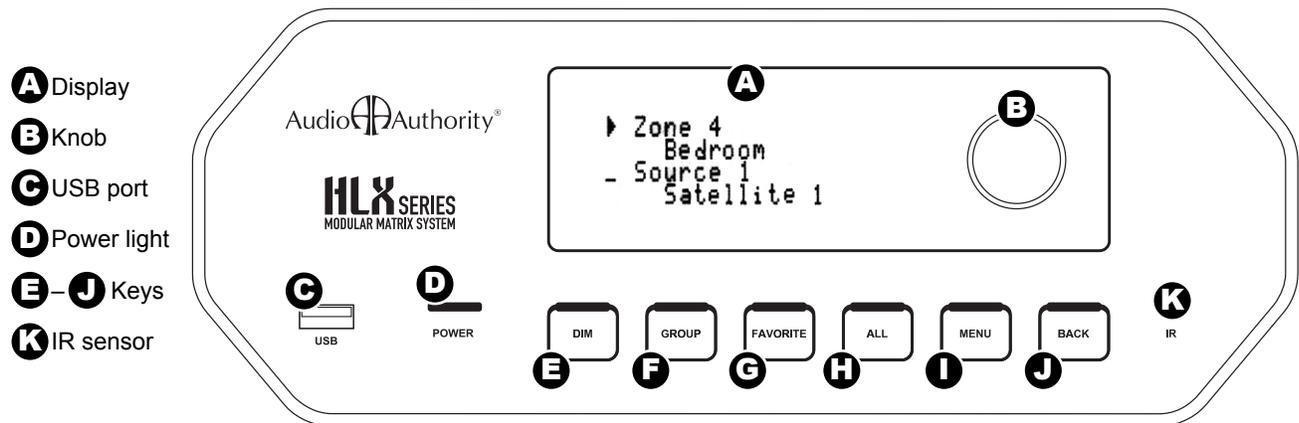
Shown below is a six-slot Model 2006 card cage with available cards represented. The power supply module also provides the location for the control interface connections. Model 2014 expander cage (see page 11) provides slots for four zone cards, and includes its own power supply and front panel power light. See audioauthority.com/hlx_config.



- A Ethernet communication port
- B RS-232 serial communication port
- C IR input via 3.5mm for controlling HLX only
- D AC power port and fuse
- E Optical digital audio input
- F Coaxial digital audio input
- G Left and right analog audio input
- H Component video YPbPr (do not use for composite video)
- I IR output for source control signals from zone locations
- J Source card status light (green) and IR activity light (yellow)
- K SD video inputs (S-video, BNC, or composite RCA)

- L Analog audio source input
- M 12 V power switches for IR pathways (Use caution, see page 12)
- N Zone IR jack for sending IR commands to the HLX and sources
- O IR output jack for sending or receiving zone IR via the Cat 5 pathway
- P Zone Cat 5 audio/video outputs A and B
- Q Zone analog audio outputs (with volume control and DSP features)
- R IR input from zone receiver
- S Zone card status light (green) and IR activity light (yellow)
- T Analog audio zone output (DB25 for Audio Authority amplifiers)
- U Chassis serial number

OPERATION



Front Panel Controls

The 2006 front panel includes the display, IR sensor, keys and knob, plus a USB port. The front panel is operated by using six touch sensitive keys: Dim **E**, Group **F**, Favorite **G**, All **H**, Menu **I**, and Back **J** and a Multi-Function Knob **B**.

Multi-Function Knob Operation: Used to navigate through all menu items, the multi-function knob can scroll (clockwise or counterclockwise) and select or de-select (press in). The open arrow \triangleright symbol is displayed when scrolling through menu items. Once an item has been selected (by pressing in the knob), the arrow fills in \blacktriangleright . Next, turn the knob to adjust the value. Finally, press in the knob again to de-select the menu item and scroll to the next item that needs to be adjusted.

Zone/Source Selection Screen

This default screen performs zone and source switching via the Multi-Function Knob **B**.

Group Button **F** > Group Selection Screen

This screen displays all configured groups and allows for group source selection. To learn more about zone groups and defining zone groups, see page 28.

About Groups: The HLX is capable of storing up to 10 Groups. Each group may be assigned a name up to 16 characters long. Groups can only be created using the HLX PC utility (see page 28) or serial commands (page 22).

Favorite Button > Favorite Selection Screen **G**

This screen displays all configured favorites. To learn more about defining favorites, see page 27. To select a favorite, rotate the knob until the desired favorite is listed, then press in the knob to activate it.

About Favorites: Favorites are unique zone and source combinations, or audio “scenes” such as party, dinner, game night, etc. Favorites allow the end user to recall these audio scenes with a remote or touchscreen control. The HLX is capable of storing up to 10 Favorites. Each Favorite may be assigned a unique name up to 16 characters in length. Favorites can only be configured and named using the HLX PC utility (see page 27) or with serial commands (page 22).

All Button > All Selection Screen **H**

This screen allows switching all output zones to a single source.

Menu Button > Menu Screen **I**

Press the Menu Button to access the following sub-menus: Volume, Equalizer, Tone/Lowpass, Balance, Network Settings, Export File, Import File, Front Panel IR, Display Settings, Expander Cards, Firmware Versions, Firmware Update, Factory Defaults.

Back Button **J**

Pressing this button returns you to the previous screen. Press the back button repeatedly to return to the default Zone/Source screen.

Dim Button **E**

This button toggles through four predefined brightness levels for the VFD (Vacuum Fluorescent Display) and panel lights. After a set period of time (adjustable using the front panel or in the HLX PC utility), the VFD enters screen saver mode (off). The power and other panel lights remain on to show that the unit is receiving power. Any key press or knob adjustment (including IR command) returns the VFD to the last selected brightness level.

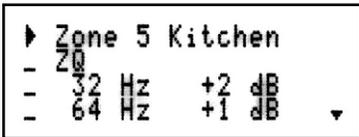
Volume*

Adjusts the volume level (measured in dB) for each zone output. Displays real-time zone output level meters and source selection. Scroll past 0 db to set a zone output to "fixed." See page 10 for more information on fixed volume applications.



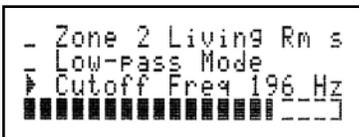
Equalizer* (ZQ Mode and EQ Preset Mode)

Use to switch between ZQ Mode (10-band zone EQ) or EQ Preset Mode (10 Global EQ presets assignable to any zone). Both ZQ and EQ Preset Modes allow for adjustment of all 10 bands of equalization. EQ can be bypassed by selecting "EQ Disabled". All ten frequencies are reset to flat, but returning to either EQ mode recalls the last settings.



Tone/Lowpass*

Use to switch between Tone Mode or Lowpass Mode. Tone Mode allows for adjustment of bass and treble levels and Lowpass Mode allows for adjustment of the crossover frequency of a zone's low-pass filter. Lowpass mode is used to assign a zone output to a dedicated subwoofer. Additionally, a low-pass zone output can be grouped together with a full range zone output (using HLX PC utility) for a 2.1 audio "zone". See page 26 for more information on setting up a lowpass zone in the HLX PC utility. Tone and Lowpass filters can be bypassed by selecting "Tone/LP Disabled".



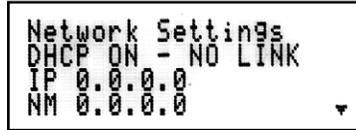
Balance*

Use to adjust the Left/Right stereo balance (measured in db) for a zone output. Also displays real-time Left/Right balance level meters.



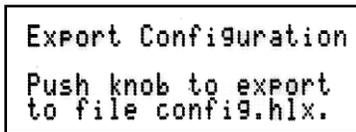
Network Settings

Displays the current network settings of the HLX. See page 12 for more information on Network Settings.



Export File

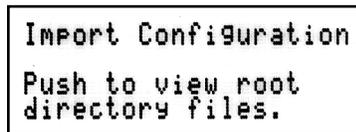
With a USB 1.1 or USB 2.0 drive connected to the USB port **(C)** on the rear panel of the HLX, follow the on screen instructions to export to the default file name, "config.HLX". If the file is already present, you will be prompted to overwrite it.



Note – The USB port is v1.1 and v2.0 compatible. There is a small delay when inserting a USB drive in order to identify the device and mount the file system. Although many different drives were tested successfully with the system, not all USB drives will work with the HLX. Tested file systems include FAT and FAT32.

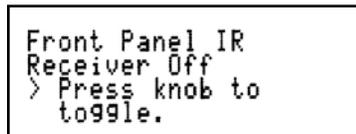
Import File

This selection imports the configuration settings from a text file on a USB drive. Simply follow the on screen instructions to select the file to import, which must have the "*.HLX" format. Once the file has been selected, the fourth line of the screen displays the commands as they are read from the file and a serial/telnet connection details the commands read and their execution status.



Front Panel IR

This screen allows the front panel IR receiver to be turned on or off. Factory default is off.



* All volume and equalization features are functions of digital signal processing, so they are only available in 2214 and 2278 zone cards.

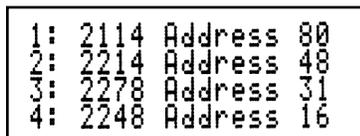
Display Settings

Shows current settings for the front panel display: Sleep timer (screen timeout) and display brightness. The sleep timer can be set to 5, 2 and 1 minute(s) or Disabled. Brightness can be set to 25%, 50%, 75% or 100%.



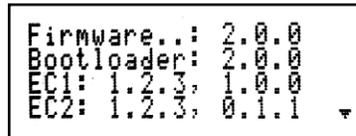
Expander Cards

Lists slot number, card model number and address of each expander card installed in the HLX.



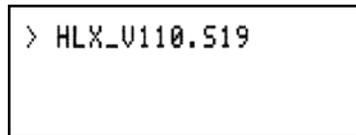
Firmware Versions

Displays the firmware versions of the primary firmware and the boot-loader.



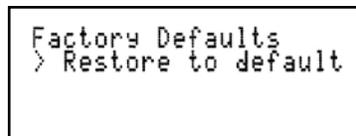
Firmware Update

Use to load firmware updates to the HLX using a USB drive. Follow on-screen instructions and/or the text file instructions included with online firmware updates.



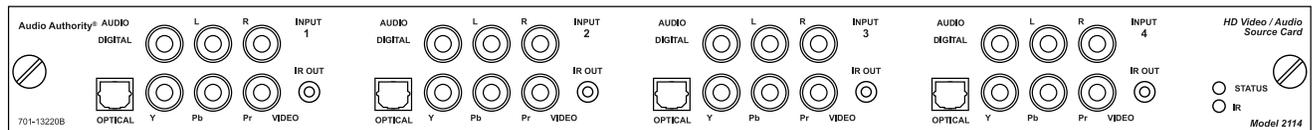
Factory Defaults

Use to restore all HLX settings to factory default. Follow on-screen instructions.

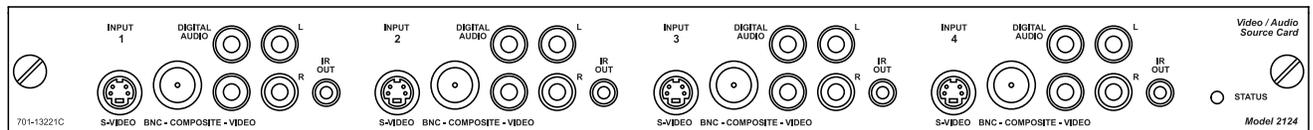


Matrix Switching Cards

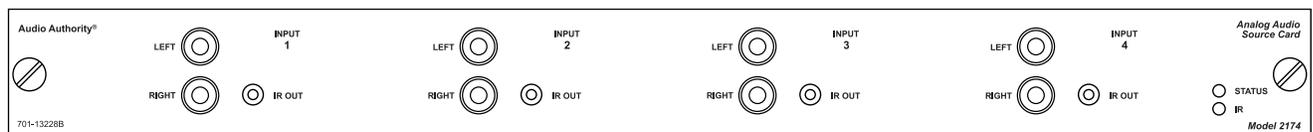
- **2114 Source Cards** • component video, stereo analog audio, digital coaxial audio, digital optical audio, and IR out jacks. Four sources per card.



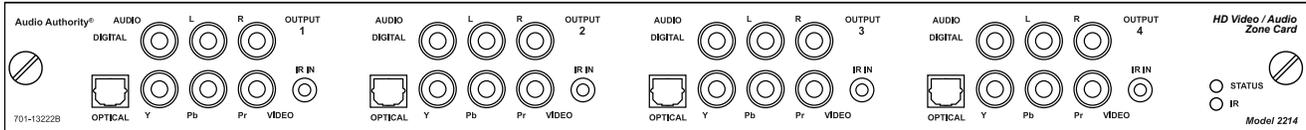
- **2124 Source Cards** • Composite video (BNC and RCA), S-video, stereo analog audio, digital coaxial audio, digital optical audio, and IR out jacks. Four sources per card.



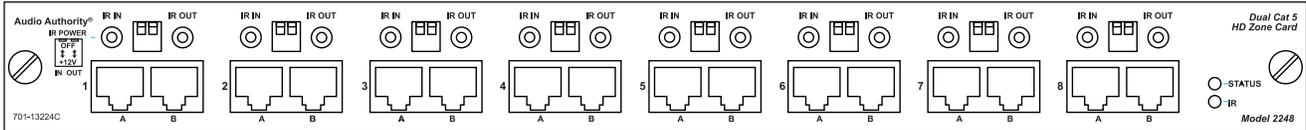
- **2174 Source Cards** • Analog audio (left and right), and IR out jacks. Four sources per card.



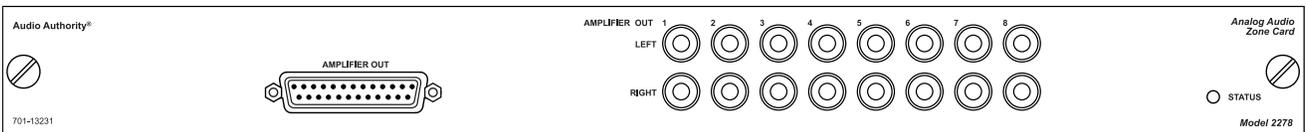
- **2214 Zone Cards** • component video, stereo analog audio (with DSP), digital coaxial audio, digital optical audio, and IR in jacks. Four zones per card.



- **2248 Zone Cards** • Dual Cat 5 outputs for zone receivers carrying component video, stereo analog audio, digital coaxial audio, digital optical audio, and IR signals. IR injection jacks for incoming and outgoing control signals. Eight zones per card.



- **2278 Zone Cards** • stereo analog audio (with DSP) via RCA jacks or DB25 quick connect for Audio Authority amplifiers. Four zones per card.



Cat 5 Zone Receivers for Model 2248 Zone Cards

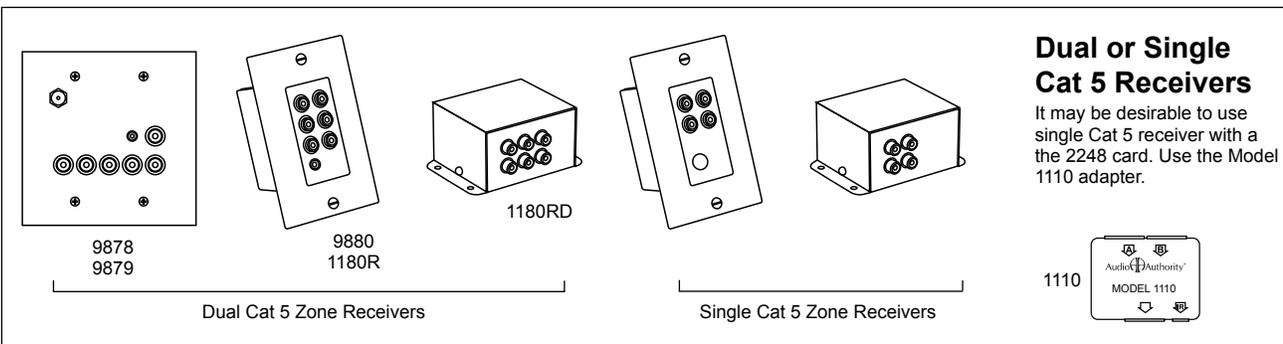
Model 2248 zone cards require Cat 5 receivers to terminate the zone wiring. Five styles are available. The two single Cat 5 zone receivers require an adapter to convert the dual Cat 5 output of the 2248 to single Cat 5. Single Cat 5 zones do not include an IR pathway, but the adapter provides a separate IR jack for IR wiring if desired.

Zone Receiver Styles

- **Model 9878** • Dual-gang wallplate receiver, stainless steel, shallow mounting depth with antenna pass-through jack
- **Model 9879** • Single-gang wallplate, Decora style with front and rear facing IR inputs
- **Model 9880** • Surface mount receiver, can be mounted on any surface or hidden
- **Model 1180RD** • Single-gang, single Cat 5 wallplate, Decora style (does not have analog audio or IR)
- **Model 1180R** • Surface mount receiver (does not have analog audio or IR), can be mounted on any surface

Cat 5 Zone Receiver Features

Features	9878	9879	9880	1180R	1180RD
Component Video	Yes	Yes	Yes	Yes	Yes
Digital Audio	Yes	Yes	Yes	Yes	Yes
Analog Audio	Yes	Yes	Yes	-	-
IR	Yes	Yes	Yes	-	-
Cat 5	Dual	Dual	Dual	Single	Single
Adapter req.	-	-	-	1110	1110



Dual or Single Cat 5 Receivers

It may be desirable to use single Cat 5 receiver with a the 2248 card. Use the Model 1110 adapter.

HLX System Design Rules



Note: Consult Audio Authority Technical Support before performing any in-field upgrades.

Use the configurator (audioauthority.com/hlx_config) to configure your HLX system, or your Audio Authority Account Manager can help you choose the correct source and zone cards for your application.

Card Placement Rules

Systems are pre-assembled at the factory, but for field modifications, observe the following rules. To install a card, carefully slide each card into the HLX card cage and seat the connector in the backplane. Start the screws, then push the card in all the way before tightening the screws.

1. The first card slot must have a source card installed.
2. Slot 2 may have a source card installed or may be left empty. Do not install a zone card in slot 2.
3. Slot 3 accepts either a source or zone card. Do not install a zone card in slot 3 if there is a source card in slot 4.
4. Slot 4 accepts any zone card, or the 2174* audio source card. Do not install other source cards in slot 4.
5. All other slots (including 2014 Expansion Cage) accept zone cards only.
6. Sources and zones are numbered sequentially, left to right, starting with the top card in the card cage.
7. When a card is added, the HLX re-numbers the source and zone positions.

Source Card Placement

AV source cards must be placed into the top two or three slots. Do not leave a vacant slot between two source cards, and do not install a zone card above a source card.

- Slot 1 – Source Card 1, Source 1-4
- Slot 2 – Source Card 2, Source 5-8
- Slot 3 – Source Card 3, Source 9-12
- Slot 4 – Source Card 4, Source 13-16 (audio only*)

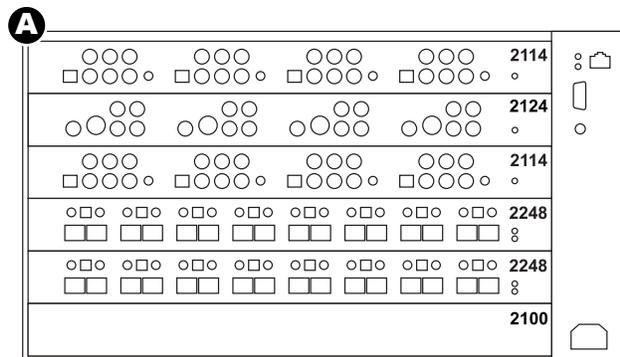
Zone Card Placement

Zone cards can be installed in slots 3-10, but you may leave gaps between zone cards for future expansion if desired. Remember, the zones are numbered in order, based on the card location in the card cage. If slot 3 is the only vacant slot for an additional zone card, it is often best to move existing zone cards up to fill the top slots, then add the new card to the bottom slot to preserve programmed zone numbering.

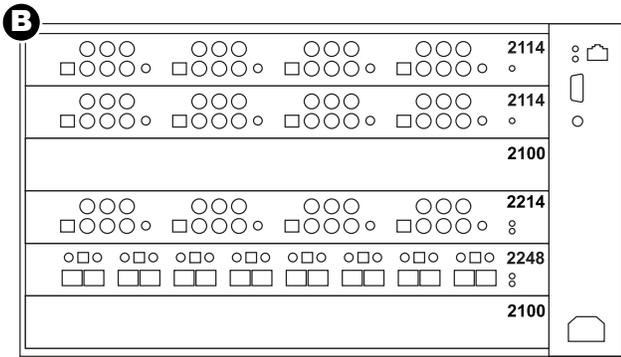
- Slot 3 – Zone Card 1, zones 1-8 (or blank)
- Slot 4 – Zone Card
- Slot 5+ – Zone Cards

Example Card Combinations

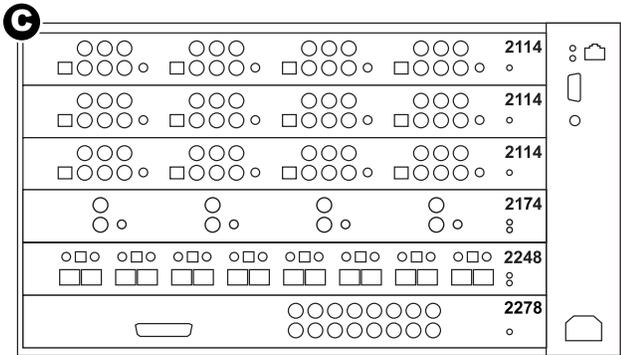
Thousands of different HLX combinations are possible, so those shown below are intended only to represent specific cases and limitations of the HLX system. The best way to build and verify a system is to use the online HLX configurator and send the configuration number to your account representative.



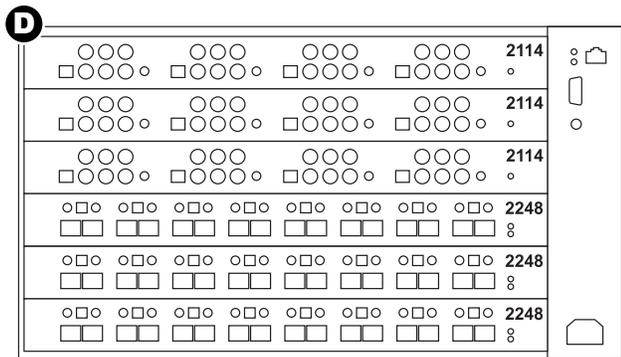
Example A incorporates the 2124 source card which offers SD inputs, scaled to Y Pb Pr. Useful for adding security camera feeds and/or legacy sources into the HD distribution system.



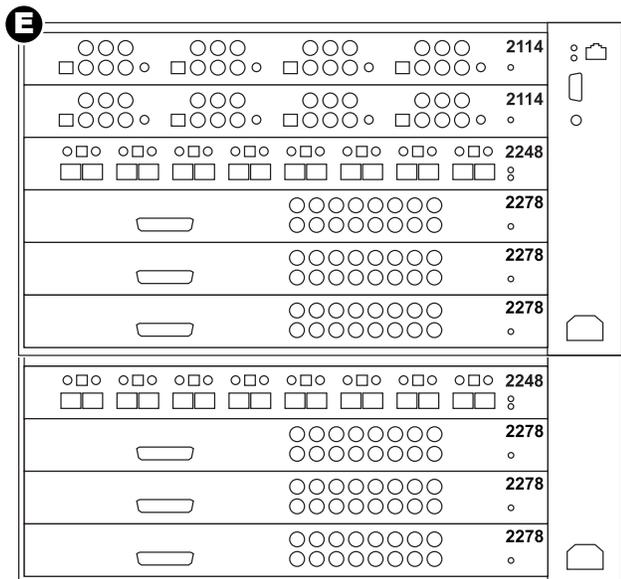
When installing a system with open slots it is a good practice to leave slot 3 open for the addition of a source card in the future; otherwise adding a source card would necessitate moving the zone cards down a slot.



Example C shows the maximum number of sources (12 audio/video sources and 4 audio sources*). Slot 4 cannot accept a video source card.



Example D shows the maximum number of video sources* (12) with the maximum video zones (24) in a single card cage.



Example E represents the maximum number of zones (64 zones) using the expanded card cage. Video and audio zone cards can be mixed in any order.

* 2174 inputs in slot 4 can only be accessed by 2278 cards; 2174 inputs in slots 1, 2, and 3 are available to any zone card.

Installation

1. Read this entire instruction manual.
2. Confirm that nothing is missing from your shipping carton (see below).
3. Activate your warranty and receive future update notifications by registering your purchase on our website: www.audioauthority.com/register.
4. Write the serial number (see product rear panel) on the back cover of this manual.
5. Connect associated equipment (sources, TVs, etc.)
6. Connect the HLX to a suitable power outlet and test.
7. Perform desired setup operations via RS-232 or Ethernet if desired (see Appendix A).

Carton Contents

HLX card cages and modules are shipped assembled in a carton, or if an expansion cage is included, in two cartons. Each carton includes:

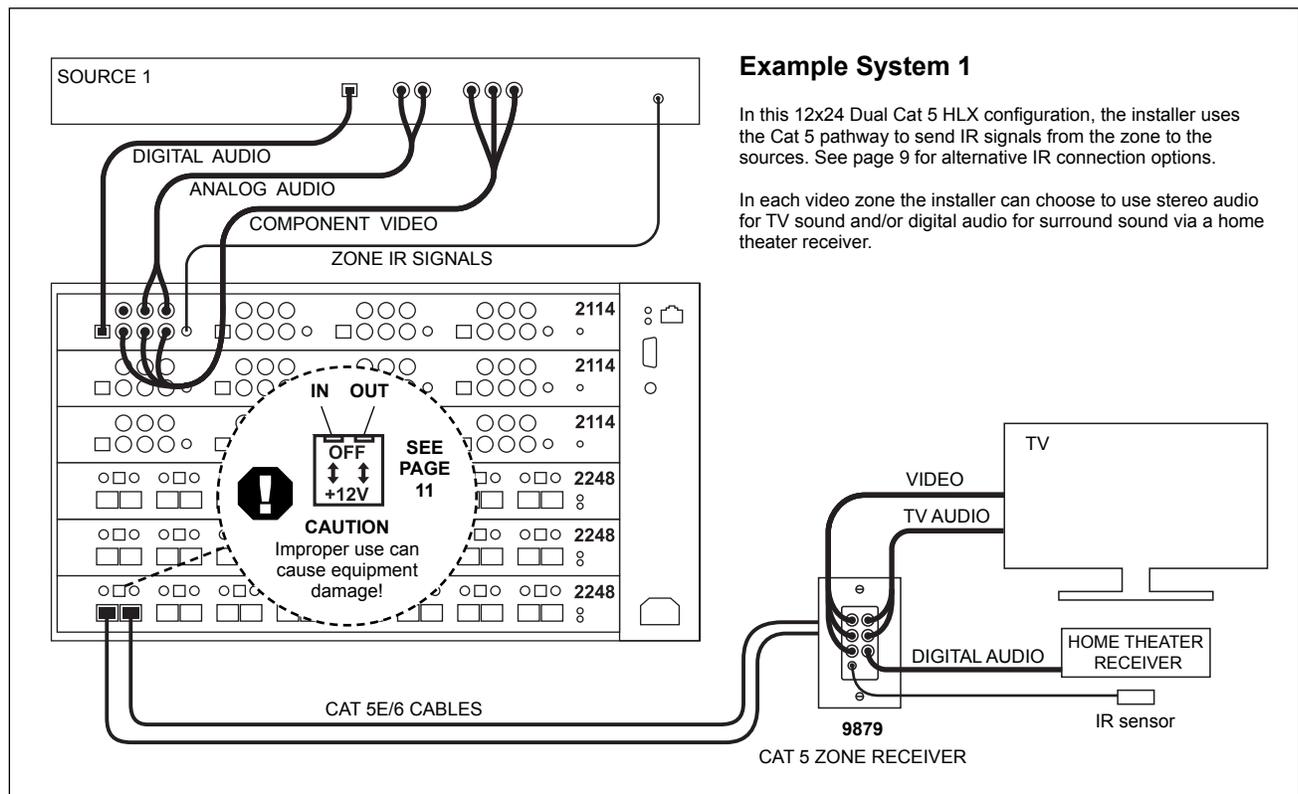
1. Card cage with installed cards
2. Power cord
3. User manual

Other Items Required for Installation

- Audio Authority Cat 5 Zone Receivers (required with 2248 zone cards)
- Cable and terminations (2248 zone cards require Cat 5e/6 UTP cable, terminations, tools and professional network cable tester*)
- Patch cables for source and zone AV and IR connections (RCA, 3.5mm, and/or optical)
- Infrared sensors (required only if zone IR is installed)

Suggested Accessories

- Model 1362 Up-converter/scaler: converts composite or S-video signals to component video for legacy video sources.
- Model 1366 Video Converter: converts YPbPr to RGBHV or VGA to YPbPr for incompatible video sources or projectors and video displays.
- Model 979T Digital to analog audio converter: converts PCM digital audio (optical or coaxial) to analog audio with digital pass-through.



* It is strongly recommended to test both factory made and site-fabricated Cat 5e/6 cables with a professional tester; balanced line pairing order is essential for optimal picture quality. Simple continuity testing of the conductors does not insure noise free performance.

Hardware Installation

Mount the HLX in a 19-inch equipment rack. Secure the card cage with four screws (supplied). If your system includes a 2014 expansion card cage install it first, then carefully seat the 2006 card cage onto the 2014 multi-pin connector and fasten it to the rack. Check that each pre-installed card is properly seated in the card cage.

Wiring Sources and Initial Testing

Component Video Source Card – Model 2114

Connect high quality Component Video cables (YPbPr), analog audio (L/R) and* either digital coaxial audio or digital optical audio (one form of digital audio ONLY) to each source input.

Composite Video Source Card – Model 2124

Connect a Composite Video cable (S-Video and BNC are also available), analog audio (L/R) and* either digital coaxial audio or digital optical audio (one form of digital audio ONLY) to each source input. The 2124 scales standard 480i video signals to 480p and converts the color space to Component Video.

Analog Audio Source Card – Model 2174

Connect audio sources using stereo RCA cables.

Source Card IR Outputs

IR outputs on source cards relay IR signals from the zones to the source device. Connect IR emitters from the IR jacks on each source card to respective sources. Place the emitter over the IR sensor on the source front panel, or connect a patch cord to a rear panel input.

Wiring Zones

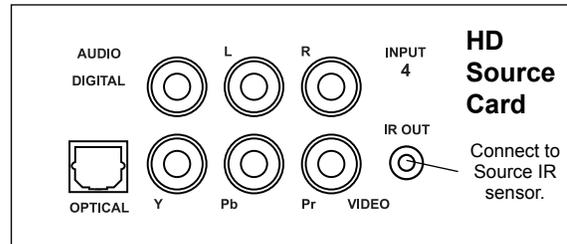
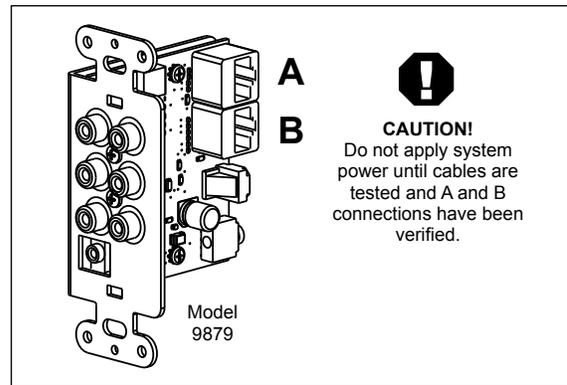
- **Model 2214** – Connect local Component video and audio devices and IR sensors if desired.
- **Model 2248** – Carefully mark two Cat 5e/6 cables as cable A and B and pull them to the receiver location. It is essential that the A and B cables are correctly connected; swapping cables can result in permanent damage to the receiver.

IR Input and Output jacks Dual 3.5mm jacks at each 2248 zone position are for IR control signals. The IN jack accepts signals for the HLX and also repeats signals through the source card IR outputs. The 2248 OUT jack sends OR receives signals from the Cat 5 zone receiver.

Zone IR 12V Power Leave 12V switches OFF (up position) unless compatible equipment requires 12V power. See diagrams on pages 11-12 for details.

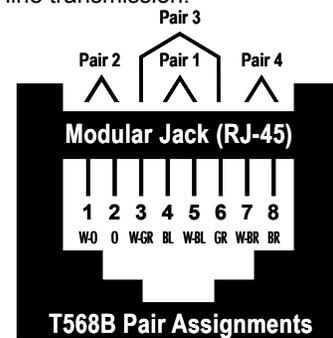
Dual Cat 5 Zone Receiver Carefully connect the cables marked A and B to the appropriate Cat 5 jacks on the zone receiver. Set the cable length compensation rotary switch based on the length of the cables (0 for 0-99 feet, 1 for 100-199 feet, etc). Connect component video, analog audio, and/or digital coaxial cables to the zone receiver. Connect an IR sensor to the zone receiver.

- **Model 2278** – Connect audio outputs to multi-channel amplifier(s) or AV receivers. The DB25 connector is for the SonaFlex™ amplifier in development at Audio Authority.



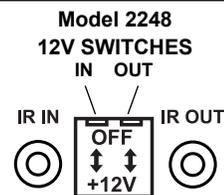
Terminating Cat 5e and Cat 6

1. Install RJ-45 plugs using EIA-568B pairing (pins 1-2, 3-6, 4-5, 7-8).
2. Check each cable with a **professional network cable tester** before plugging it into the zone card, *even when using pre-made cables*. Continuity testing is not adequate! The twisted pairs must be properly matched for balanced line transmission.

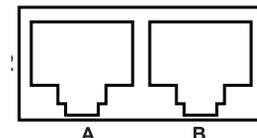


Dual Cat 5 Zone Card IR Switches

Enable 12V for a zone that includes a compatible IR sensor.



CAUTION
Improper use can cause equipment damage!



SEE PAGE 11 FOR PROPER SETTINGS

* If both analog and digital audio are desired in a zone, both digital AND analog audio inputs must be connected from the source to the HLX source card.

Choosing a Control Method

	RS-232	Ethernet	Front Panel IR	Zone IR	Panel Controls
AV signal switching, groups, favorites	✓	✓	✓	✓	✓
Volume up/down (incremental) and mute	✓	✓	✓	✓	✓
10-band EQ, balance, advanced volume	✓	✓	-	-	-
Dim front panel lights and display	✓	✓	✓	-	✓
Breakaway switching	✓	✓	✓	✓	-
Restrict source (temporary lock)	✓	✓	✓	✓	-
Permanent Source Restriction	✓	✓	-	-	-
Disable front panel IR	✓	✓	-	-	✓
Lock front panel keys	✓	✓	-	-	-
Change Ethernet settings	✓	(a)	-	-	-
Update firmware	-	-	-	-	(b)

Centralized serial or Ethernet control systems provide the most robust and complete HLX control; however, comprehensive IR controllers and zone IR control are often good alternatives. Most commands are available to all control methods; the major differences are shown in the table.

- (a) If an automatic IP protocol is used to obtain an IP address, the only direct way to obtain the new IP address is to query the HLX Ethernet settings using RS-232, or use front panel controls.
- (b) All firmware updates must be performed via USB.

HLX Front Panel Controls

Front panel control is performed via touch sensitive keys and a selector knob (see page 6 for instructions).

- The default screen is the zone/source switching screen. Scroll through sources using the knob, press the knob to choose a source, then scroll to select a different zone.
- To perform multiple switching operations, use GROUP, FAVORITE and ALL keys (some setup required).
- Zone volume may be adjusted using the menu (only for 2214 and 2278 zone cards).

Ethernet or RS-232 Serial Control

System controllers and PCs can send all setup and control commands via the RS-232 serial port and receive feedback.

- Important: observe the correct pinout for controlling the HLX via RS-232 (straight through) cable
- Serial control is capable of performing all commands
- See page 16 for details on using HLX commands

IR Control Options

The HLX can be controlled using IR in three different ways (see example systems on the following pages).

Zone Receiver IR – Use a programmable IR remote through an IR sensor connected to the IR jack on each Cat 5 zone receiver. Audio zones (without Cat 5 receivers) must be wired for IR separately. This method requires less programming, but relies on optical IR sensors. See the Troubleshooting Section on page 21 for tips on using optical IR sensors.

Head End Zone IR – Use an RF controller or other wireless or wired control system and connect its outputs

to the IR input jacks on the zone cards at the head end. See the RF Base Station diagram on page 12. This method avoids the use of optical IR, but still associates each command with a zone, reducing programming time.

Discrete Commands via Main IR – Use a centralized remote control system and connect its IR output to the Main IR jack on the HLX rear panel. This method avoids using optical IR sensors in the zones, but may require more programming than Zone Receiver IR. Discrete commands are available for each zone that include the zone number, reducing the need for macros.

Programming an IR Control System for HLX

Programmable IR control systems (Control4, URC, RTI, Logitech, etc.) can use the complete HLX IR code set, along with the codes to control the source devices.

- If the HLX IR codes are available from your remote control company, download and/or activate those files, following instructions provided with the remote control.
- Hex codes are available in xls or pdf format here: audioauthority.com/product_details/HLX.
- An RTI code library is also available here: audioauthority.com/product_details/HLX.
- Logitech Harmony remote controls can access the HLX IR codes in the Harmony database here: Amplifier>Audio/Video Switch>Audio Authority>HLX.
- Download the HEX file from the Audio Authority website. Use the button information to program the remote according to the instructions provided with the remote control.

Follow operation tips and command sequences in the Zone IR or Head End IR explanation in the IR Command Protocol section on the following pages.

IR Command Protocols

In essence, the HLX can receive IR commands in two ways: IR from individual zone inputs, or IR through the Main input. Zone IR commands do not require the zone number to be sent first, because the HLX knows the origin of the command. Use discrete commands (zone number embedded) with the Main IR input to avoid building macros.

Zone IR

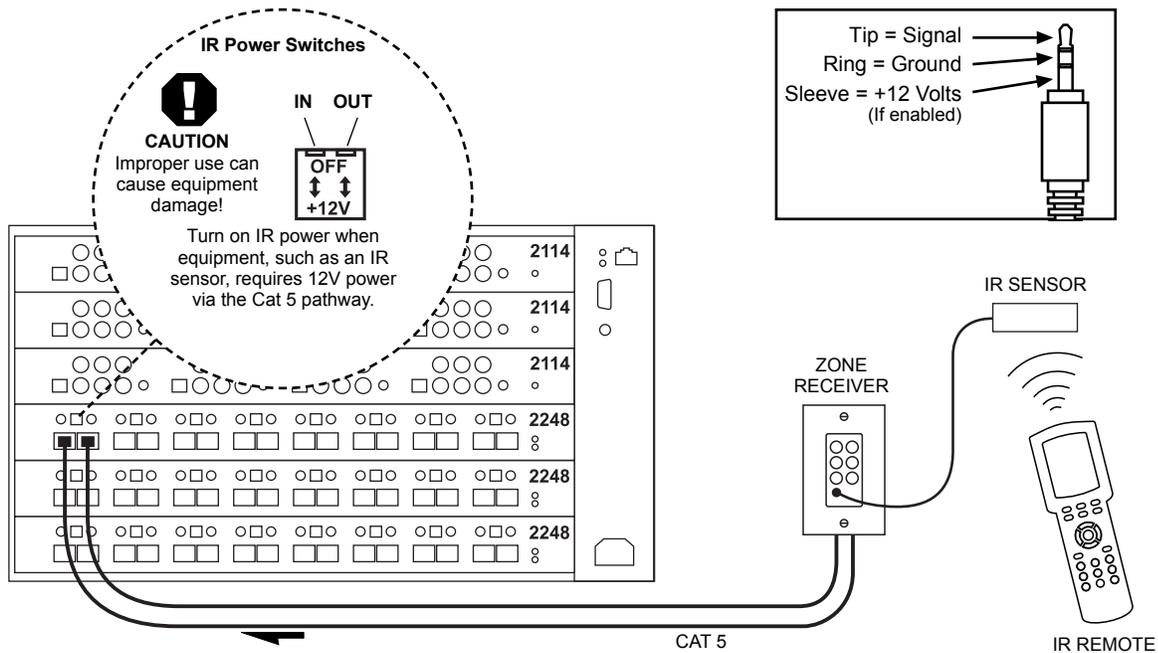
“Buttons” for Remote Control Systems

When programming a remote control system for zone use, the following functions are available:

- **Source Buttons:** 16 switching buttons cause the source connected to the zone to be switched, given the current configuration (sources that do not exist or that are restricted in some way cannot be selected).
- **Audio/Video Buttons:** breakaway switching is possible by first pressing the audio or video button and then a source button; only the audio or video signal is switched.
- **Lock Access:** remove other zones viewing the source selected and temporarily restrict other zones from selecting or controlling the source (see p.14).
- **Lock Control:** temporarily restrict other zones from passing IR to the selected source device (see p.14).
- **Unlock:** cancel all temporary restrictions placed from this zone.
- **Digits:** the 0-9 digits on the remote can be used to enter group or favorite numbers.
- **Favorites:** activates a predetermined combination of zone/source selections; requires a number to be entered on the 0-9 digits (1-10) before pressing the favorite button for activation (setup via serial or front panel).
- **Groups:** sets a predetermined list of zones to the specified source video, audio or both. Press the desired group number, group button, audio or video modifiers, and finally the source button (setup via serial or front panel).

IR Control from Zones

An IR sensor connected to a zone receiver IR jack can be powered via connecting block in the zone, or powered with 12 volts from the HLX. To enable HLX power, move the OUT dip switch to the *down* position to power a compatible IR sensor in the zone. CAUTION: Can cause damage if used with incompatible IR equipment. Check voltage and pinout.



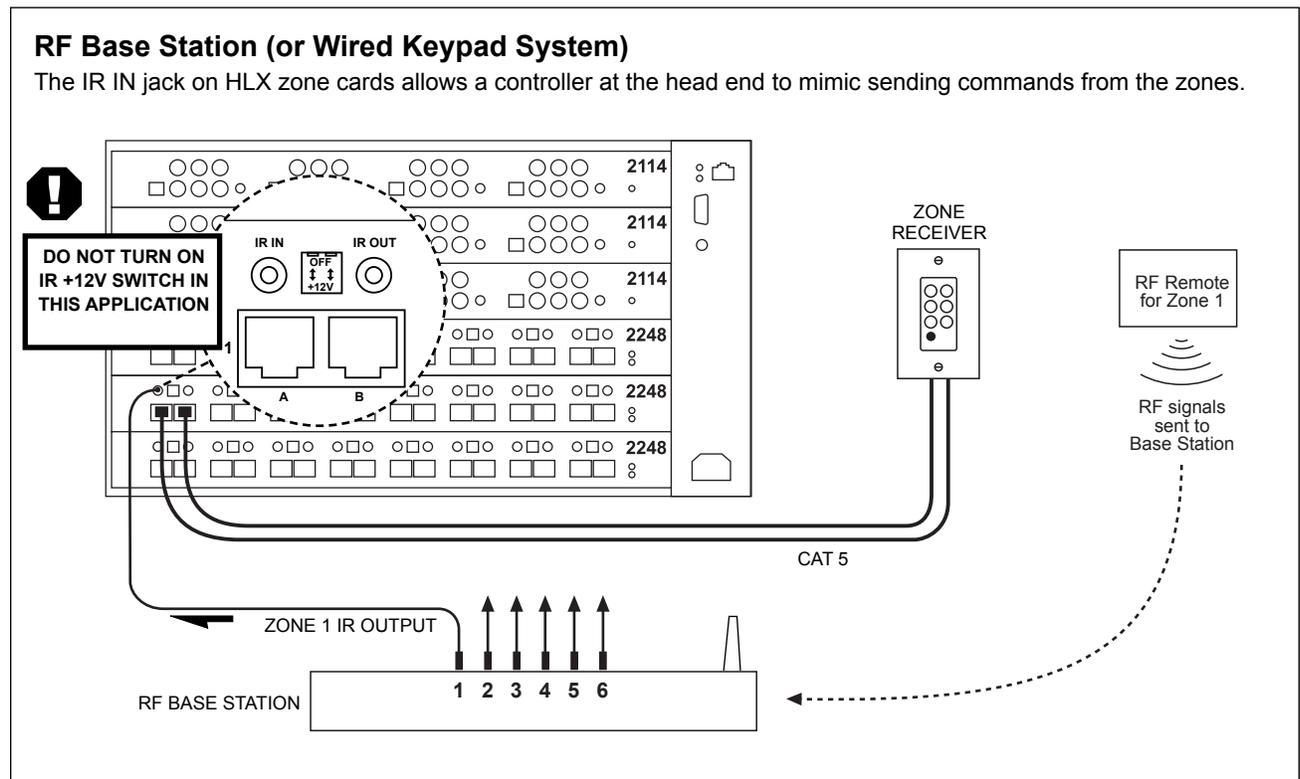
Zone IR Operation Example

System Status:

- 8 source inputs (1-8)
- 8 zone outputs (1-8) on a Model 2248 output card
- No restrictions in place
- IR sensor connected to the zone 1 IR input
- Favorite 7 is defined as: “zones 1-8 switch to source 2”
- Group 1 contains zones 1-4

Example Sequence of Commands

1. **SOURCE1** – zone 1 is connected to source 1
2. **VIDEO SOURCE2** – switch zone 1 to view source 2 but keep listening to source 1
3. **LOCK ACCESS** – temporarily restrict zones 2-8 from viewing source 2, the currently viewed source in zone 1. Breakaway is canceled for zone 1 and zone 1 is forced to view and listen to source 2, the source that it was viewing when the restriction was activated.
4. **SOURCE1** – switch zone 1 back to watching/listening to source 1. The temporary restriction is canceled by switching away from the restricted source.
5. **LOCK CONTROL** – temporarily restrict zones 2-8 from passing IR control to source 1. For example, source 1 may be connected to a DVD player. Zones 2-8 would be unable to use DVD player IR remote commands such as stop, reverse, skip, etc.
6. **UNLOCK** – removes temporary restrictions on source 1 (lock control).
7. **VOLUME UP** – adjusts the volume in variable audio zones*.
8. **7 FAVORITE** – all zones 1-8 switch to source 2
9. **1 GROUP VIDEO SOURCE4** – zones 1-4 are switched to watching source 4 video, but remain listening to the audio connected to source 2.



* Volume commands are only valid for zone cards that have analog audio jacks (2214 and 2278). The command has no effect on 2248 cards, which do not have analog audio jacks.

Main IR (Head End)

Discrete IR “Button” Commands

Discrete buttons reduce the need to use several commands together to accomplish simple tasks when using the Main IR input. Discrete button commands are available to perform the following tasks:

- Connecting a zone to a source
- Mute on/off or toggle a zone
- Volume up/down in a zone
- Balance left/right or center in a zone
- Bass up/down or flat in a zone
- Treble up/down or flat in a zone
- Connecting a group to a source
- Group volume up/down
- Group mute on/off or toggle

Main IR Operation Example

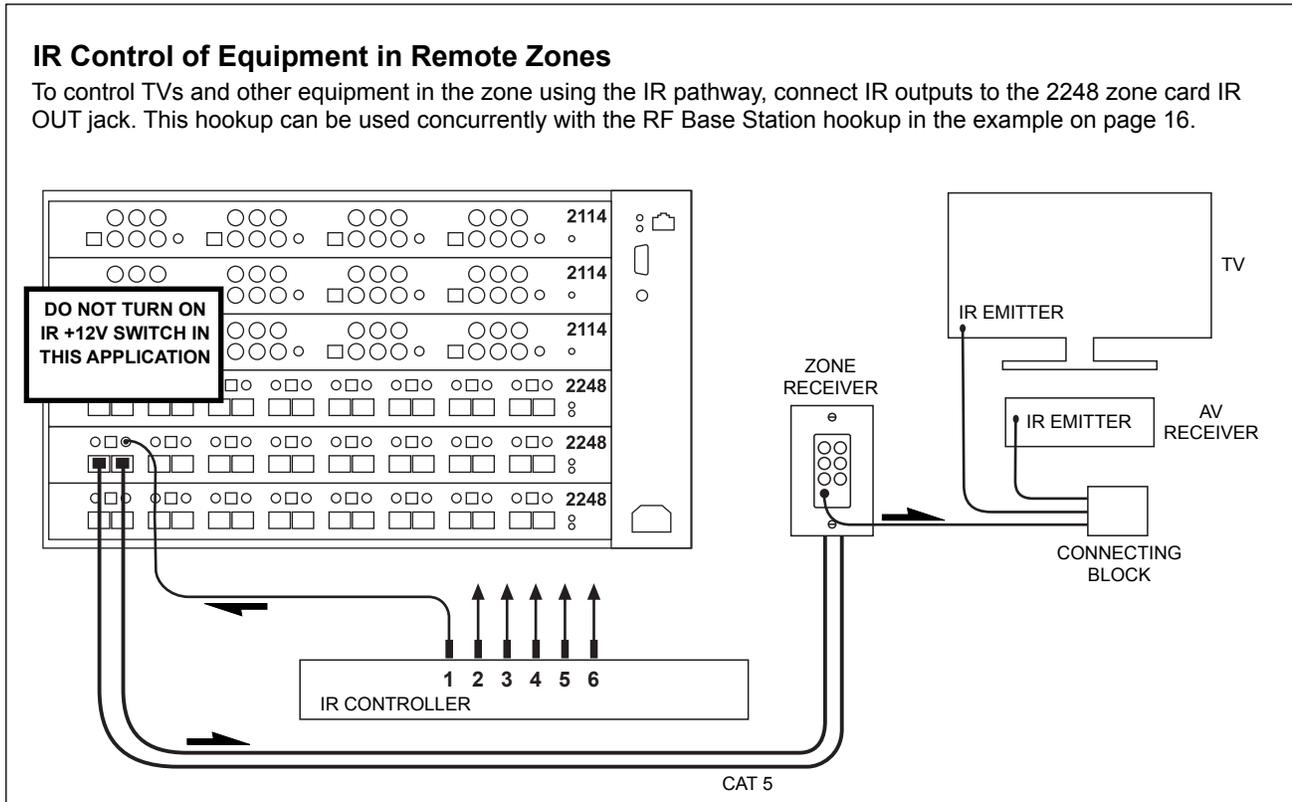
IR is received through the Main input jack.

System Status:

- 12 source inputs (1-12)
- 4 audio source inputs (13-16)
- 8 audio zone outputs (1-8) Model 2278 output card
- 8 AV zone outputs (9-16) Model 2248 output card
- IR controller connected to the HLX Main IR input
- Favorite 8 is defined as: “zones 6-8 switch to source 5”
- Group 2 = video zones 9-12 and audio zones 4-6

Example Sequence of Commands:

1. **ZONE14 SOURCE1** – this is a single IR command that connects zone 14 to source 1.
2. **1 4 VIDEO SOURCE3** – switch zone 14 to view source 3 but keep listening to source 1. This is a “breakaway” command, so there is no discrete command that includes the zone number.
3. **ZONE14 SOURCE3** – zone 14 is now watching/listening to source 3.
4. **ZONE14 SOURCE2** – zone 14 fails to connect to source 2 because it is restricted. Zone 14 returns to source 3.
5. **GROUP2 VOLUME UP** – adjusts the volume up in zones 4-6. (Variable audio zones* only).
6. **8 FAVORITE** – zones 6-8 switch to source 5 (music server).



Using Restrictions

The HLX system can be set up to deny certain zones access to certain sources. These “restrictions” can be either permanent (until reprogrammed) or temporary (active until they are cancelled or expire).

Temporary Source Restrictions (Lock Access)

This feature allows a viewer in one zone to view* content privately; all other zones are locked out of the source while the temporary restriction is in place. When activated, other zones currently viewing the source are switched to the next available source. Temporary restrictions automatically expire after five hours; alternatively they are canceled by switching away from the restricted source or explicitly issuing an unlock command.

Example of Temporary Restriction

- Zone 1 and zone 2 are viewing source 7.
- Zone 2 applies a temporary viewing restriction to source 7.
- Zone 1 is switched to source 8, but if source 8 is also restricted, source 1 is selected, etc.

If a zone has access to one source only, that source is not allowed to be restricted.

Placing and cancelling temporary restrictions have other limitations based on the control interface and will be described in their respective control sections.

Temporary Control Restrictions (IR)

A Control Restriction locks out other zones from controlling** the selected source through the HLX integrated IR control pathway. Other zones may still view the source, and an automation system may still control the source independent of the HLX IR pathway. Expires after five hours, or by switching away from the restricted source or issuing an unlock command.

Permanent*** Source Restrictions

When a zone is permanently restricted from viewing** a source, it may not select that source under any circumstances. Temporary source restrictions supplement permanent restrictions, and may add further restrictions to the available sources that a zone may view.

** “View,” In the context of restrictions, means to select, watch and/or listen to a given source. The term “control” means to send IR commands through the HLX IR pathway to control a source (e.g. change channels, stop, play, etc.).

*** Permanent source restrictions may be applied or removed only through serial or Ethernet commands, or by using the HLX configuration utility on a PC.

Serial Control Setup

- All serial commands require opening and closing brackets “[]” but do not require any periods, spaces, or commas. Spaces or commas may be used for clarity.
- Commands can be in any order: [RPZ1] = [R, Z1, P]
- ASCII codes not specified are ignored (i.e. control codes, unused alphanumeric characters, etc.).

Default RS-232 Port Settings

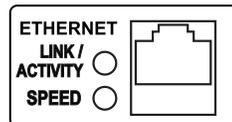
Transfer Rate (bits per second)	9,600 bps
Data Bits	8
Stop Bits	1
Parity	None
Flow Control or Data Flow	None
Character type	ASCII
Interface connector	DB-9
DB-9 Electrical rating	Pins 2 and 3, ±15 VDC
DB-9 Pin-out (Straight through cable, not crossover)	Pin 2, Tx Pin 3, Rx Pin 5, Ground Shell, Ground

Ethernet Control Setup

 Consult your network administrator if you are unfamiliar with setting up a network connection.

HLX commands (complete list begins on p. 16) can be issued using an Ethernet connection and a telnet program. There are two LED indicators located next to the Ethernet port on the rear panel that will help in identifying connection issues:

- **Link Light** – steadily lit when a connection is detected and flashes when network activity is present.
- **Speed Light** – Speed is off for 10 base T, and on for 100 base T.



Using the Ethernet Port

To use an automation controller, tablet, or phone to send commands via Ethernet to the HLX you must establish a network connection and then enter the HLX IP address into the automation controller. Once connected to a network, by default, the HLX attempts to obtain an IP address automatically using DHCP. If DHCP is enabled on your network, simply connect the HLX to the network with an existing DHCP server to obtain all necessary settings. Then you can obtain the HLX IP address in one of two ways. Either navigate to network settings using the HLX front panel menu, or query the HLX via serial commands (see page 18). If DHCP is not enabled on your network, use static settings (see below.)

Static Addressing (Through a Network)

- The HLX must be set to the same settings as the control device or PC except for the IP address, which must be one that is available on the network. To determine this in Windows, use the DOS prompt (Start->Run->cmd) commands ipconfig and ping. Ipconfig will list the PC's settings, and ping will allow you to test addresses to make sure that nothing else on the network has that address.
- Once connectivity is established, a telnet program such as Hyper Terminal, Teraterm, PuTTY etc, can be used to connect to the HLX. Enter the IP address of the HLX and leave the default port (23) to connect. Once connected, all HLX commands can be issued in an identical manner to serial control.

Static Addressing (Connected Directly to a PC)

- The HLX must be given an IP address which will not conflict with the PC. Go to the network settings (which are found in control panel -> network -> local connection properties of a PC running Windows XP).
- Change the TCP/IP protocol properties, and set the IP address, gateway, and subnet mask, if they are not already set. These can be chosen arbitrarily on a direct connection, but a good choice for the settings would be as follows:

IP address	192.168.0.1
Subnet mask	255.255.255.0
Default gateway	(leave empty)
- Once these values have been set, use serial commands to set the network settings of the HLX in a similar manner, but use a different IP address than that of the computer (for example, 192.168.0.2).

Appendix A: Serial and Telnet Commands

Zone Commands

Description	Structure	Example	Reply	Result
SOURCE SELECT				
Switch a zone to a source input	[CO###I##]	[C01I2]	(C01I2)	Zone output 1 is connected to source input 2
Switch all zones to one source input	[CXI##]	[CXI4]	(CXI4)	All zone outputs are connected to source input 4
Switch a zone output to a source audio input (breakaway switching)	[CO###AI##]	[C05AI6]	(C05AI6)	Audio for zone output 5 is connected to source input 6.
Switch zone video output (breakaway)	[CO###VI##]	[C05VI7]	(C05VI7)	Video for zone output 5 is connected to source 7.
Turn on zone tracking	[TRO###O##]	[TR0208]	(TR0208)	Pair zone 2 with zone 8.
Turn off zone tracking	[TRO###]	[TR02]	(TR02)	Breaks the pairing of zone 2 with zone 8.
Switch all zones to an audio input	[CXAI##]	[CXAI4]	(CXAI4)	All zones are connected to source audio input 4.
Switch all zones to a video input	[CXVI##]	[CXVI4]	(CXVI4)	All zones are connected to source video input 4.
VOLUME				
Zone volume up one step	[VO##U]	[V03U]	(V03R-20)	Zone 3 volume increased one step to -20 dB
Zone volume down one step	[VO##D]	[V03D]	(V03R-21)	Zone 3 volume decreased one step to -21 dB
Set zone volume level	[VO##R##]	[V01R-10]	(V01R-10)	Zone 1 volume is -10 dB, Range: -80 to 0 dB
MUTING				
Zone mute	[VMO##]	[VM01]	(VM01)	Zone 1 output is muted
Zone unmute	[VUMO##]	[VUM03]	(VUM03)	Unmute Zone 3 and set to previous volume level
Zone mute toggle	[VMT0##]	[VMT02]	(VM02) or (VUM02)	Zone 2 is muted or Zone 2 is returns to previous volume level
BALANCE				
Increment balance to the left	[BO##LU]	[B05LU]	(B05L40)	Zone 5 balance adjusted to the left, now +40
Increment balance to the right	[BO##RU]	[B05RU]	(B05L39)	Zone 5 balance adjusted to the right, now +39
Balance to the center	[BO##R0] or [BO##L0]	[B01R0] or [B01L0]	(B01R0) (B01L0)	Zone 1 balance is centered
Set balance level left	[BO##L##]	[B07L70]	(B07L70)	Zone 7 balance is left +70 Range: 0 to +80, 0 = center
Set balance level right	[BO##R##]	[B07R25]	(B07R25)	Zone 7 balance is right +25 Range: 0 to +80, 0 = center
LOWPASS MODE				
Set to lowpass mode	[EO##M4]	[E02M4]	(E02M4)	Zone 2 is in lowpass mode and mono (subwoofer)
Set lowpass crossover frequency	[EO##LP##]	[E02LP115]	(E02LP115)	Lowpass filter for Zone 2 is now 115 Hz Range: 40 Hz to 240 Hz
TONE MODE (BASS & TREBLE)				
Set to tone mode	[EO##M3]	[E02M3]	(E02M3)	Zone 2 is switched to tone mode (bass/treble)
Bass up/down one step	[TO##BU] [TO##BD]	[T016BU] [T016BD]	(T016B10T0) (T016B9T0)	Zone 16 bass level increased to +10 dB Zone 16 bass level decreased to +9 dB
Treble up/down one step	[TO##TU] [TO##TD]	[T08TU] [T08TD]	(T08B9T1) (T08B9T0)	Zone 8 treble level increased to +1 dB Zone 8 treble level decreased to 0 dB
Set bass/treble level	[TO##B##T##]	[T02B-3T9] [T02B0T0]	(T02B-3T9) (T02B0T0)	Zone 2 bass is -3 dB and treble is +9 dB Zone 2 bass/treble = flat Range: -12 to +12 dB, 0 = flat
ZQ MODE (10-BAND ZONE EQ)				
Set to ZQ mode	[EO##M1]	[E04M1]	(E04M1)	Zone 4 is switched to ZQ mode
ZQ band up/down one step	[EO##B##U] [EO##B##D]	[E03B1U] [E03B1D]	(E03B1L6) (E03B1L5)	Zone 3, EQ band 1 increased to +6 dB Zone 3, EQ band 1 decreased to +5 dB
Set ZQ band level	[EO##B##L##]	[E012B2L-4] [E012B2L0]	(E012B2L-4) (E012B2L0)	Zone 12, EQ band 2 is set to -4 dB Zone 12, EQ band 2 is set to unity gain (0) Range: -10 to +10 per band, 0 = flat

Save ZQ settings to EQ preset	[EO##STP##]	[E05STP2]	(E05STP2)	Saves zone 5 ZQ settings to preset #2 Zone must be in ZQ mode. 10 presets available.
EQ PRESET MODE (GLOBAL EQ PRESETS)				
Set zone to EQ preset mode	[EO##M2]	[E09M2]	(E09M2)	Zone 9 is switched to EQ preset mode
Query an EQ preset	[QEP##]	[QEP8]	(EP8N"JAZZ") (EP8B1L2) (EP8B2L2) (EP8B3L1) (EP8B4L0) (EP8B5L-1) (EP8B6L2) (EP8B7L3) (EP8B8L5) (EP8B9L0) (EP8B10L2) (QEP8)	Preset 8 name is JAZZ EQ band 1 level = +2 EQ band 2 level = +2 EQ band 3 level = +1 EQ band 4 level = 0 EQ band 5 level = -1 EQ band 6 level = +2 EQ band 7 level = +3 EQ band 8 level = +5 EQ band 9 level = 0 EQ band 10 level = +2
Description	Structure	Example	Reply	Result
Adjust EQ preset band up/down	[EP##B##U] [EP##B##D]	[EP9B1U] [EP9B1D]	(EP9B1L3) (EP9B1L2)	EQ preset 9, band 1 increased to +3 dB EQ preset 9, band 1 decreased to +2 dB
Set EQ preset band level	[EP##B##L##]	[EP2B9L-6] [EP2B9L0]	(EP2B9L-6) (EP2B9L0)	EQ preset 2, band 9 is set to -6 dB EQ preset 2, band 9 is set to unity gain (0) Range: -10 to +10 per band, 0 = flat
Apply EQ preset to a zone	[EO##P##]	[E07P3]	(E07P3)	Zone 7 is now in preset mode, using preset 3
ZONE QUERY COMMANDS				
Query volume status	[QVO##]	[QV016]	(V016R-30)	Zone 16 volume level is -30 dB
Query mute status	[QVMO##]	[QVMO7]	(VMO7)	Zone 7 is muted
Query a zone's source connection	[QCO###]	[QC04]	((C04I1)	Zone output 4 is connected to source input 1
Query all information about a zone	[QO###]	[Q08]	(E08M0) (B08L0) (V08R-12) (VUM08) (C08I4) (N08"POOL") (Q08)	DSP mode=2 (Tone) Balance=0 (Flat) volume is set to -12 not muted source input 4 selected the name of the zone is POOL
MISCELLANEOUS				
Name an output zone	[NO###"@"]	[N03"Den"]	(N03"Den")	Zone 3 is named "Den"
Name an input source	[NI###"@"]	[NI3"ipod"]	(NI3"ipod")	Source 3 is named "ipod"

Restrictions

Restrict (IR) control of the source connected to a particular zone (Temporary - expires after 300 min.)	[RCO###]	[RC08]	(RC08)	Other zones are prevented from sending IR to source connected to zone 8. Expires after 300 minutes.																																																																								
Restrict a source to one zone (Temporary - expires after 300 min.)	[RTO###]	[RT09]	(RT09)	Only zone 9 may view the source connected to it for 300 minutes, until the restriction is cancelled.																																																																								
Cancel temporary restrictions on the source connected to a particular zone	[AO###]	[A03]	(A03)	All zones may view or send IR signals to the source connected to zone 3.																																																																								
Restrict a particular zone from viewing a source (Permanent)	[RPO###I##]	[RP04I9]	(RP04I9)	Prevent zone 4 from viewing source input 9.																																																																								
Cancel a permanent restriction	[AO###I##]	[A04I9]	(A04I9)	Allow zone 4 to view source 9.																																																																								
Erase all permanent restrictions	[RAR]	[RAR]	(RAR)	All zones can view all sources.																																																																								
Restrictions Map	[RMAP]	[RMAP]	<table border="1"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> <tr><td>1</td><td>x</td><td>P</td><td>-</td><td>-</td><td>-</td><td>T</td><td>-</td></tr> <tr><td>2</td><td>c</td><td>-</td><td>-</td><td>-</td><td>-</td><td>T</td><td>-</td></tr> <tr><td>3</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>x</td><td>-</td></tr> <tr><td>4</td><td>A</td><td>-</td><td>-</td><td>-</td><td>V</td><td>T</td><td>-</td></tr> <tr><td>5</td><td>x</td><td>-</td><td>-</td><td>-</td><td>-</td><td>T</td><td>-</td></tr> <tr><td>6</td><td>x</td><td>-</td><td>-</td><td>-</td><td>-</td><td>T</td><td>-</td></tr> <tr><td>7</td><td>-</td><td>-</td><td>x</td><td>-</td><td>-</td><td>T</td><td>-</td></tr> <tr><td>8</td><td>x</td><td>-</td><td>-</td><td>-</td><td>-</td><td>T</td><td>-</td></tr> </table>	1	2	3	4	5	6	7	8	1	x	P	-	-	-	T	-	2	c	-	-	-	-	T	-	3	-	-	-	-	-	x	-	4	A	-	-	-	V	T	-	5	x	-	-	-	-	T	-	6	x	-	-	-	-	T	-	7	-	-	x	-	-	T	-	8	x	-	-	-	-	T	-	Zones on the left side, sources on the top. x = Connected P = Restriction (permanent) T = Viewing Restriction (temporary) c = Control Restriction (temporary) A = Audio Connected V = Video Connected (not audio)
1	2	3	4	5	6	7	8																																																																					
1	x	P	-	-	-	T	-																																																																					
2	c	-	-	-	-	T	-																																																																					
3	-	-	-	-	-	x	-																																																																					
4	A	-	-	-	V	T	-																																																																					
5	x	-	-	-	-	T	-																																																																					
6	x	-	-	-	-	T	-																																																																					
7	-	-	x	-	-	T	-																																																																					
8	x	-	-	-	-	T	-																																																																					

Group Commands

<i>Description</i>	<i>Structure</i>	<i>Example</i>	<i>Reply</i>	<i>Result</i>
SOURCE SELECT				
Switch a group to a source input	[CG##I##]	[CG2I4]	(CG2I4)	All zones in group 2 switch to source input 4
Switch a group's audio to one source	[CG##AI##]	[CG3AI7]	(CG3AI7)	Group 3 switch audio to source 7
Switch a group's video to one source	[CG##VI##]	[CG3VI5]	(CG3VI5)	Group 3 switch video to source 5
VOLUME				
Group volume up one step	[VG##U]	[VG7U]	(VG7R-4)	Group 7 volume increased one step dB to -4 dB
Group volume down one step	[VG##D]	[VG7D]	(VG7R-5)	Group 7 volume is decreased one step to -5 dB
Set group volume level	[VG##R##]	[VG1R-10]	(VG1R-10)	Group 1 volume is -10 dB, Range: -80 to 0 dB
MUTE				
Mute a group	[VMG##]	[VMG4]	(VMG4)	Group 1 output is muted
Unmute a group	[VUMG##]	[VUMG4]	(VUMG4)	Unmute Group 1, set to previous volume level
Mute toggle a group	[VMTG##]	[VMTG3]	(VMG3) or (VUMG3)	Group 3 is muted or Group 3 returns to previous volume level
GROUP QUERY				
Query a group	[QG##]	[QG10]	(G10A5) (G10A9) (NG10"GUEST") (QG10)	Group 10 members include zones 5 and 9, group name is "GUEST"
MISCELLANEOUS				
Add a zone to a group	[G##AO###]	[G1A03]	(G1A03)	Zone 3 is now a member of group 1
Remove a zone from a group	[G##RO###]	[G1R03]	(G1R03)	Zone 3 is removed from group 1
Name a group	[NG##"@"]	[NG1"Bedrms"]	(NG1"Bedrms")	Group 1 is named "Bedrms"
Erase all group members	[GAR]	[GAR]	(GAR)	All groups are empty (no member zones)

Favorites

<i>Description</i>	<i>Structure</i>	<i>Example</i>	<i>Reply</i>	<i>Result</i>
Connect a favorite	[CF##]	[CF3]	((CF3)	Favorite 3 is now connected
Add zone/source combination to a favorite	[F##AO##I##]	[F1A03I2]	(F1A03I2)	Favorite 1 now includes zone 3/source 2
Add an audio only zone/source combination to a favorite	[F##AO##AI##]	[F2A09AI8]	(F2A09AI8)	Add the zone 9, source 2 audio only combination to favorite 2.
Add a video only zone/source combination to a favorite	[F##AO##VI##]	[F2A09VI5]	(F2A09VI5)	Add the zone 9, source 2 video only combination to favorite 2.
Query a favorite	[QF##]	[QF10]	(F1A01I3) (F1A03I4) (NF1"Favorite 1 Name") (QF10)	Query favorite membership and settings. See the favorite adding and naming commands for how to read the results
Remove a zone/source combination from a favorite	[F##RO###]	[F1R03]	(F1R03)	Remove zone 3 from favorite 1
Name a favorite	[NF##"@"]	[NF1"Gameday"]	(NF1"Gameday")	Favorite 1 is named "Gameday"
Erase all favorite memberships	[FAR]	[FAR]	(FAR)	All favorites are empty (no member zones)

Front Panel Interface Adjustment

Description	Structure	Example	Reply	Result
Query front panel interface lockout	[QFPL]	[QFPL]	(FPL0) (QFPL)	Front panel interface is locked out (1) or unlocked (0)
Lock or unlock front panel interface	[FPL#]	[FPL0] [FPL1]	(FPL0) (FPL1)	Front panel interface is locked out (1) or unlocked (0)
Query front panel IR lockout	[QIRL]	[QIRL]	(IRL0) (QIRL)	Front panel IR is disabled (1) Front panel IR is enabled (0)
Enabled or disable front panel IR	[IRL#]	[IRL1] [IRL0]	(IRL1) (IRL0)	Front panel IR sensor off or disabled (1) Front panel IR sensor on or enabled (0)
Dim front panel display and controls	[SD#]	[SD1]	(SD1)	Shows screen and LED brightness setting Range: 0-3

Configuration Utilities

Description	Structure	Example	Reply	Result
Query the current configuration	[QX]	[QX]	(SC100) (SD4) (SBL100) (SLED100) (DHCP1) ...	All configuration information is returned in parentheses
Editable configuration or backup	[QXSB]	[QXSB]	[SC100] [SD4] [SBL100] [SLED100] [DHCP1] ...	All configuration information is returned in square brackets that can be edited and/or reloaded into the HLX to restore settings
Load the backup configuration	[LOAD]	[LOAD]	(LOAD)	Loads a configuration from output in square brackets
Reset configuration to factory defaults	[RESET]	[RESET]	(RESET)	Loads the factory default settings for every option
Save the current configuration to active memory	[SAVE]	[SAVE]	(SAVE)	Saves current configuration settings immediately; HLX auto-saves settings every 30 seconds during normal operation

Network Settings Adjustment

Note: Network settings are stored but not committed until the [EC] command is sent, or HLX power is cycled. The [SAVE] command does not commit network settings.

Description	Structure	Example	Reply	Result
Query current network (Ethernet) settings	[QE]	[QE]	(DHCP1) (IP0.0.0.0) (NM0.0.0.0) (GW0.0.0.0) (MAC00-00-5E-A8-00-D3)	DHCP status, IP address, subnet mask, gateway, and MAC address are displayed by this command
Enable or disable dynamic host configuration protocol (DHCP)	[DHCP#]	[DHCP1] [DHCP0]	(DHCP1) (DHCP0)	DHCP is enabled (1) or disabled (0) It is not possible to set a static IP address while DHCP is on
Define the static IP address	[IP###.###.###.###]	[IP192.168.0.212]	(IP192.168.0.212)	Set the IP address to the specified value
Define the default gateway	[GW###.###.###.###]	[GW192.168.0.2]	(GW192.168.0.2)	Set the default gateway for accessing computers outside of the subnet
Define the subnet mask	[NM###.###.###.###]	[NM255.255.255.0]	(NM255.255.255.0)	Set subnet mask (determines devices accessible without traveling through the gateway)
Commit network settings	[EC]	[EC]	(EC)	This command makes it possible to set a static IP/gateway/network mask over telnet without being disconnected

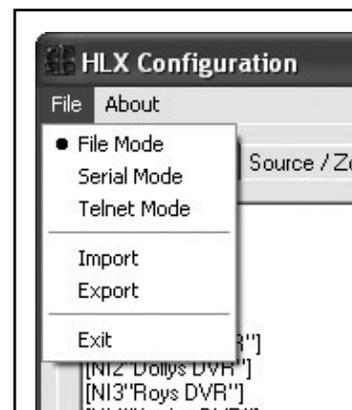
CONFIGURATION

The HLX PC configuration utility is the easiest way to perform advanced setup tasks. Most of these tasks may also be accomplished using serial or Ethernet commands, or via the HLX front panel controls (see page 6).

Initial Setup

1. **Select Programming Mode:** Select the mode you will be using for your HLX configuration. There are three options:

- File Mode - (default) requires a USB drive to save and transfer the setup file to the HLX via the back panel USB jack.
- Serial Mode - requires a direct serial port connection.
- Telnet Mode - requires a connection via a network or a direct Ethernet connection.



2. **Load a Snapshot of Your HLX Configuration:** Before you can use the utility, the software must import a configuration file, which is a "snapshot" of your HLX configuration (the number of cards installed and all other settings).

- a. If you are using file mode, use the HLX front panel controls to navigate to the Export menu, insert a USB drive, and export the configuration file for import to your PC.
- b. If you are using serial or telnet, choose Import from the utility file menu.

Configuration File Page

Upon import, this page shows all settings in the existing configuration file. This page is primarily used for diagnostics and troubleshooting. In most cases this information should not be modified.

Source/Zone Naming Page

This page lists all current Zone and Source Names. To change the names of zones and sources, double click in the appropriate field and type in your changes. Use up or down arrow keys to move to the next field.

Zone Names	
Zone 1	Livingroom
Zone 2	Greatroom
Zone 3	Diningroom
Zone 4	Kitchen
Zone 5	Familyroom
Zone 6	Theater
Zone 7	Gameroom

Source Names	
Source 1	Sat Radio
Source 2	Dollys DVR
Source 3	Roys DVR
Source 4	Kevids DVR
Source 5	Barrys DVR
Source 6	AppleTV
Source 7	Cable

Favorite/Group Naming Page

This page lists all current configured Favorites and Groups. To change the names of Favorites and Groups, double click in the appropriate field and type in your changes. Use up or down arrow keys to move to the next field.

Favorite Names	
Favorite 1	Football
Favorite 2	Kids party
Favorite 3	Dinner party
Favorite 4	Goodnight
Favorite 5	Movie
Favorite 6	Games

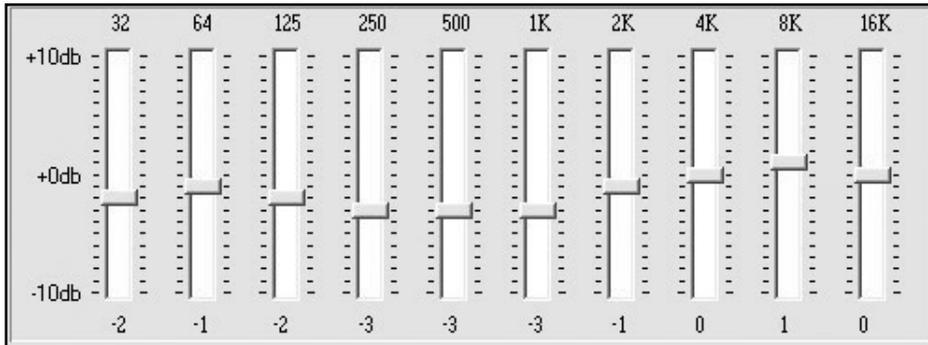
Group Names	
Group 1	Groundfloor
Group 2	Small TVs
Group 3	Bedrooms
Group 4	Outdoors
Group 5	Audio
Group 6	Public

Zone Audio Controls Page

This page includes all software tools required to modify zone-specific DSP settings for the HLX. Below is a summary of each tool:

10-band Zone Equalization (ZQ Mode)

1. Select the zone you wish to adjust
2. Select **ZQ Mode** from the DSP Mode dropdown menu
3. Make desired EQ adjustments for any of the 10 available frequency bands*



Save ZQ Settings to an EQ File

Occasionally, it may be desired to save a zone's ZQ settings to a file so that those settings can be used in future ZQ adjustments. This is accomplished using the following steps:

1. Select the zone from which you wish to copy settings.
2. Select ZQ Mode from the DSP Mode dropdown menu.
3. Under the PC Quick EQ Presets section, click the "Save" button.
4. Name the new EQ file.
5. The EQ file is now saved in a folder on your computer for use in other projects. To recall, the EQ file must reside in the same folder with the PC Utility.

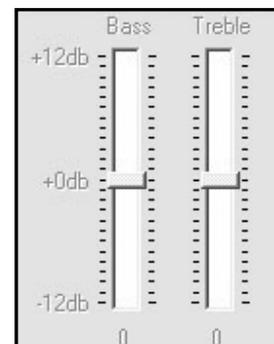
Global EQ Presets (Preset Mode)

The HLX includes 10 built-in "Global" EQ presets, which can be used by any HLX zone. By default, all 10 EQ presets are flat. *Adjustment of global EQ presets is accomplished using the HLX EQ Presets page (See page 26). Once all EQ presets have been set up, preset mode can recall any global preset to a zone.*

1. First, make sure the desired EQ preset has been set up on the HLX EQ Presets page.
2. Select **Preset Mode** from the DSP Mode dropdown menu.
3. Select a zone.
4. Select the desired EQ preset from the HLX EQ Preset dropdown menu*.

Bass & Treble (Tone Controls)

1. Select the zone you wish to adjust.
2. Select **Tone Controls** from the DSP Mode dropdown menu.
3. Make any desired bass and treble adjustments*.



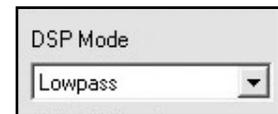
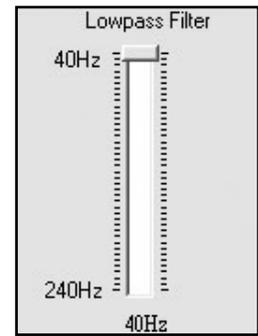
**IMPORTANT NOTE: In order to hear your changes, you must transfer all utility settings into the HLX using the "export" option from the File menu. For real-time ZQ adjustment and monitoring, EQ presets, bass & treble changes, etc. Audio Authority offers a free iPad control template, available for download at www.audioauthority.com/page/zq_template (Requires Command Fusion™ viewer license, viewer app and design software).*

Low-Pass Filter (Low-Pass Mode)

This mode is used to turn any zone output into a dedicated mono low-pass output for a subwoofer. Additionally, a low-pass zone output can be grouped with a full range zone output to create a single 2.1 audio zone. IR and serial group commands (source, volume, and mute) can then be used to control both outputs (low-pass and full range) together. See page ??? for instructions on how to set up a zone group and page 18 for source, volume and mute group serial commands.

How to set up a low-pass zone output:

1. On the Source/Zone Naming page, select and name a zone you wish to designate as a low-pass output. If you are grouping a low-pass zone with a full-range zone, it is recommended to name your zones in pairs for clarity. For example, if Zone 1 is labeled "Master BR", Zone 2 should be labeled "Master BR Sub", and so on.
2. On the Zone Audio Controls page, select a zone for low-pass.
3. Select **Lowpass** from the DSP Mode dropdown menu.
4. Make any desired changes to the Crossover Frequency. Range of adjustment is 40Hz to 240Hz*.
5. On the Groups page, group the low-pass zone output with a full-range zone output (See page ??? for more information).



EQ/Tone Disabled

If no EQ or tone mode is desired select EQ/Tone Disabled from the DSP Mode dropdown. All levels will be flat, but previous settings can be recalled by switching back to ZQ or Tone Mode.

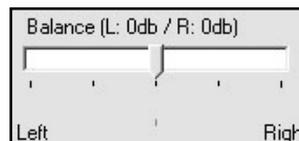
Volume

1. Select a zone.
2. Adjust volume.
3. If a zone requires a fixed volume level from the HLX (i.e. volume level is adjusted through an external amplifier or volume control), lock the front panel controls and do not include volume controls on remotes.



Balance

1. Select a zone.
2. Adjust left/right balance levels accordingly*.



Global EQ Presets Page

The HLX includes 10 built-in "Global" EQ presets, which can be used by any zone. By default, all 10 EQ presets are flat. Ten sample presets are included with the PC utility software download, and may be imported (place them in the same folder with utility and load as a ZQ setting). The HLX EQ Presets Page allows you to name all 10 presets and adjust band settings for each.

**IMPORTANT NOTE: In order to hear your changes, you must transfer all utility settings into the HLX using the "export" option from the Filemenu. For real-time ZQ adjustment and monitoring, EQ presets, bass & treble changes, etc. Audio Authority offers a free iPad control template, available for download at www.audioauthority.com/page/zq_template (Requires Command Fusion™ viewer license, viewer app and design software).*

Modify and Store Global EQ Presets

1. Select a ZQ preset.
2. Name the preset in the HLX Preset Name text box.
3. Make any desired adjustments to EQ sliders*.

Save EQ Preset to an EQ File

Occasionally, it may be desired to save a global preset's EQ settings to an EQ file so that those settings can be used in future installations. This is accomplished using the following steps:

1. Select the EQ preset you wish to copy settings from.
2. Under the PC Quick EQ Presets section, click the "Save" button.
4. Name the EQ file.
5. The EQ file is now saved in a folder on your computer for use in other projects. To recall, the EQ file must reside in the same folder with the PC Utility.



Favorites Page

Set up zone & source combination video and/or audio "scenes" such as party, dinner, game night, etc. All favorites can then be recalled with a dedicated serial or IR command, or recalled the HLX front panel. To set up a favorite, use the following steps:

1. Label your favorites on the Favorite/Group Naming page (See page 8).
2. Back on the Favorites page select a favorite name from the "Favorites" list.
3. Double click the junction between a zone and a source to include a source/zone combination into a favorite scene.
4. Breakaway switching: if you wish to switch only audio in a certain zone, or only video, right click and choose the desired setting. Junctions are marked C (combined A and V), A, or V.
5. Repeat this step for all other source/zone combinations you desire to be included in the favorite scene.
6. Follow steps 2-4 above for all additional favorites.



		Sources																
		Cable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Zones	LCD Left	C											R	R	X	X	X	X
	LCD Right		C										R	R	X	X	X	X
	Room 3			C		R	R						R	R	X	X	X	X
	Dining Room										R	R			X	X	X	X
	Hallway	C									R	R			X	X	X	X
	Living Room				V	A					R	R			X	X	X	X
	Den								R	R					X	X	X	X
	Kitchen														X	X	X	X
	Breakfast Rm														X	X	X	X
	Atrium														X	X	X	X
	Music Room								R	R					X	X	X	X



Groups Page

Use this page to put several zones into a group. Groups are useful for controlling several zones at the same time with volume, source selection and mute commands. You can also create 2.1 audio zones (a full-range and a low-pass zone output joined together) using the group feature. (More on low-pass mode: page 10.)

To set up a group, use the following steps:

1. Label groups on the Favorite/Group Naming page.
2. On the Groups page (illustration on page 12) double click the junction between a zone and a group to include a zone in a group. The group name is displayed in the upper left corner when you click on a junction square.
3. Repeat this step for all other zone/ group combinations desired.

Groups										
	1	2	3	4	5	6	7	8	9	10
Livingroom	G			G						
Greatroom	G	G		G					G	
Diningroom	G			G						
Kitchen	G			G	G					
Familyroom				G						
Theater		G								

Permanent Restrictions

Each zone/source combination can be restricted or allowed by double-clicking its box next to the desired zone. This restriction is permanent; the only way to change it is by using this utility or through serial/Ethernet commands. Note: configuration files are not password protected.

		Sources																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Zones	ipod dock 1																	
	Livingroom									R			R	X	X	X	X	
	Greatroom												R	X	X	X	X	
	Diningroom												R	X	X	X	X	
	Kitchen												R	X	X	X	X	
	Familyroom												R	X	X	X	X	
	Theater										R			X	X	X	X	
	Gameroom													R	X	X	X	X
	Bar														X	X	X	X
	Playroom													R	X	X	X	X
	Pool													R	X	X	X	X
	Hot tub														X	X	X	X
	MasterBR														X	X	X	X

Troubleshooting

IR Interference

There are many sources of possible IR interference including LCD/Plasma screens, fluorescent lights, or space heaters. IR sensors are unable to operate properly in the presence of significant interference.

1. Eliminate source of interference and use Plasma-proof and/or LCD-proof IR sensors
2. Relocate the IR sensor to shield it from interference
3. Check for IR interference using the IR diagnostic mode

IR Compatibility

The HLX only works with standard, 12 volt, three-wire receivers.

IR Connectivity Problems

1. Use a professional cable tester and re-terminate bad cable ends using EIA-568B color code.
2. IR sensors require power and may receive it from a connecting block or from a Zone card itself depending on the configuration. Contact support.

Note: native HLX IR commands sent from zone IR ports are not passed to any of the HLX IR output jacks.

Does not repeat commands from a certain IR remote

- Some IR remotes cannot be processed by the HLX.
- IR output not properly connected to external IR system – call Audio Authority Technical Support.

Does not respond to RS-232

- HLX commands not properly stored or programmed in remote control system.
- Wrong type of RS-232 cable – See specifications for proper cable pin-out on page 14.
- Incorrect serial settings in software – See page 14.

No Video / IR control after adding 2014 expander

- Incompatible firmware versions – update to latest firmware (download from www.audioauthority.com).
- Improperly seated connector – check connection for bent pins and re-seat.

Blinking Status Light on Source/Zone Card

When an unrecoverable condition has occurred on a particular card, it repeats an indicator code consisting of a set of pulses and then a short delay.

Three Blinks = Video Type Error

Four Blinks = Rail Voltage Failure

Five Blinks = Flash Memory Error

Rail Voltage Failure (four blinks)

The card has determined that the voltage powering the card is insufficient for proper operation.

All cards in one cage Rail Voltage Failure

1. Power off the system.
2. Make sure an AC power cord is connected to the card cage, and test the AC outlet for correct voltage.
3. Power on the system.
4. If the problem persists, contact support.

Single Card Rail Voltage Failure

1. Remove power from the system.
2. Disconnect all cables from the card.
3. Confirm that power is connected correctly to the cage in which the card is installed.
4. Apply power to the system.
5. If the error is gone, it may be possible that a connected source or TV is drawing too much power due to some failure. If the error is still present, contact support.
6. Remove power from the system.
7. Connect one set of cables (one pair of dual Cat 5 zone cables, or one set of source cables).
8. Confirm proper operation; repeat until the problem component is found.

Flash Memory Error (five blinks)

There is a problem reading or writing to the flash memory present on the card. Contact Technical Support.

No Video or Audio

Cat 5 Connected Zone

1. Confirm that the Cat 5 cables used in the system have been tested with a cable tester; re-terminate if necessary, using EIA-568B color code.
2. Damaged Cat 5 port – try moving Cat 5 cables to a different port to localize the problem.
3. Damaged Cat 5 receiver – swap with a known good receiver and connect to a known good output card port.

Component Connected Zone

1. Check that the cables are properly connected (Y = green, Pb = blue, Pr = red) and that only one digital audio connection (either coaxial or optical) is connected to a source card.
2. Damaged port – try moving the cables to another port and check operation.

Diagnostics and Settings

Network Settings

This diagnostic displays Ethernet settings. These settings are also accessible via serial commands.

```

Network Settings
DHCP ON - NO LINK
IP 0.0.0.0
NM 0.0.0.0
    
```

Firmware Versions

This diagnostic displays the current firmware and secondary bootloader versions present on all system components. “Firmware” is the firmware version present on the system controller card. “Bootloader” is the version of bootloader firmware present. “EC1” and “EC2” are the first two source cards and their respective firmware versions. Scroll down to see the other source and zone card firmware versions.

```

Firmware..: 2.0.0
Bootloader: 2.0.0
EC1: 1.2.3, 1.0.0
EC2: 1.2.3, 0.1.1
    
```

Updating HLX Firmware

The latest firmware is available to download to your PC from www.audioauthority.com/page/software. Follow the instructions included with the download.

Card Diagnostic

This screen shows information about each source card and zone card in the HLX system:

```

1: 2114 4 84
2: 2114 4 72
3: 2248 8 60
4: 2248 8 48
    
```

SLOT MODEL CAPACITY ADDRESS

Specifications

Model 2006 Agency Approvals	FCC, ETL
Power Supply	UL Recognized
Power Input Connector	IEC C14
Power Voltage/Polarity	100-125VAC 50-60Hz
Maximum Input Current	2.2A (Models 2006 and 2014)
Power Cord	801-163 appliance cord w/ground
Heat Output	200 BTU/hr max

Audio Parameters	
Analog/Digital	Digital/Analog
Digital Input/Output Type	Optical+Coaxial In/Coax Out
Input Impedance	75 ohms/50K ohms
Min Load Impedance	75 ohms/10K ohms
Multi-channel Digital	Yes
Frequency Response	10-50KHz
S/N Ratio	70dB
THD+Noise	0.05%
Crosstalk	-60dB

Video Parameters	
Signal Type	Component (Y Pb Pr)
Video Formats (analog)	Component Video, 480i - 1080p
Video Formats (digital)	n/a
Input/Output Impedance	75 ohms
Input Ground Isolation	No
Gain	1
Gain Accuracy	2%
3dB Bandwidth	100MHz
Input Coupling	AC
S/N Ratio	70dB
Max Gain/Equalization	40dB equalization

Limited Warranty

If this product fails due to defects in materials or workmanship within one year from the date of the original sale to the end-user, Audio Authority guarantees that we will replace the defective product at no cost. Freight charges for the replacement unit will be paid by Audio Authority (Ground service only). A copy of the invoice from an Authorized Reseller showing the item number and date of purchase (proof-of-purchase) must be submitted with the defective unit to constitute a valid in-warranty claim.

Units that fail after the warranty period has expired may be returned to the factory for repair at a nominal charge, if not damaged beyond the point of repair. All freight charges for out-of-warranty returns for repair are the responsibility of the customer. Units returned for repair must have a Customer Return Authorization Number assigned by the factory.

This is a limited warranty and is not applicable for products which, in our opinion, have been damaged, altered, abused, misused, or improperly installed. Audio Authority makes no other warranties either expressed or implied, including limitation warranties as to merchantability or fitness for a particular purpose. Additionally, there are no allowances or credits available for service work or installation performed in the field by the end user.

HLX Chassis Serial Number _____

Date of Purchase / Installation _____

Custom Installer _____

Telephone Number _____

Audio Authority

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