



INSTALLATION INSTRUCTIONS

D5SH

**DIGI-5 DDS Digital Distribution System
Structured Wiring, Single Source, 4 Zone Hub**

Safety Information



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



The lightning flash with arrowhead symbol 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) instruction in the literature accompanying the appliance.

WARNING: TO REDUCE THE RISK OF FIRE OR SHOCK,
DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

IMPORTANT SAFETY INFORMATION

Read Information — All the safety and operating information should be read before the appliance is operated.

Follow Information — All operating and use information should be followed.

Retain Information — The safety and operating information should be retained for future reference.

Heed Warnings — All warnings on the appliance and in the operating instructions should be heeded.

Wall Mounting — Mounting of this appliance should be done only by an authorized installer.

Ventilation — The appliances should be situated so that their location or position does not interfere with their proper ventilation. These appliances should never be placed near or over a radiator or heat register. These appliances should not be placed in a built-in installation such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.

Non-Use Periods — Appliances that are left unattended and unused for long periods of time should be de-energized.

Grounding or Polarization — Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one blade wider than the other blade. A grounding type plug has two blades and a third grounding prong. The polarized wide blade and the third prong are provided for your safety. If the provided plug does not fit your outlet, consult an electrician for replacement of the obsolete outlet.

Power Cord Protection — Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.

Water — Do not use the apparatus near water.

Cleaning — Unplug the apparatus from the power outlet before cleaning. Use only a dry cloth to clean the apparatus.

Power Lines — An outdoor antenna should be located away from power lines. When installing an outside antenna system, extreme care should be taken to avoid touching power lines or circuits, as contact with them may be fatal.

Object and Liquid Entry — Never insert objects of any kind through the openings of these appliances, as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Care should be taken so that objects do not fall and liquids are not spilled into the appliance through openings in the enclosure.

Servicing — Do not attempt to service these appliances yourself, as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

Damage Requiring Service — These appliances should be serviced by qualified service personnel when:

- A power supply connection or a plug has been damaged or
- If liquid has been spilled into the appliance or objects have fallen into the appliance or
- The appliance has been exposed to water or moisture or
- The appliance does not appear to operate normally or exhibits a marked change in performance or
- The appliance has been dropped or the enclosure damaged.

Replacement Parts — When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or that have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards. The Master Control Unit battery should be replaced only after turning the power off and only by an authorized installer.

Safety Check — Upon completion of any service or repairs to this audio product, ask the service technician to perform safety checks to determine that the audio product is in proper operating condition.

Lightning Storms — Unplug this apparatus during lightning storms or when unused for long periods of time.

Attachments and Accessories — Use only attachments/accessories specified by the manufacturer.

Cart, Stand, Tripod, Bracket or Table — Use only with a cart, stand, tripod, bracket or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip over.

Disconnect Device — Where the mains plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain operable.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not in-stalled and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

CAUTION: Changes or modifications not expressly approved by Xantech could void the user's authority to operate the equipment

Caring For the D5SH

Clean only with a dry soft cloth.

It is important to properly care for your D5SH Digital Audio Distribution Hub. Follow these guidelines to ensure your device is preserved and protected.

- Do not expose the D5SH to rain, liquids or moisture for an extended period of time.
- Do not expose the D5SH to temperature extremes.
- Do not place any objects on top of the D5SH to prevent chassis damage.

Precautions

- Always exercise care when operating the D5SH Digital Audio Distribution Hub.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- In the unlikely event that smoke, abnormal noise, or strange odor is present, immediately power the D5SH off. Please report the problem to your dealer immediately.
- Never attempt to disassemble the D5SH. You will lose any product warranty on the unit.

1. Introduction

Exceptional Performance

The D5SH Digital Audio Distribution Hub is capable of providing a complete single source, four zone audio distribution system. Additionally, the D5SH has the capability to expand to additional zones using a second Digital Audio Distribution Hub.

About DIGI-5 Technology

DIGI-5 is a revolutionary new technology standard that provides a complete end-to-end digital audio solution over CAT-5 wiring. DIGI-5 is based on advanced digital distribution and amplification circuits that allow multi-room audio systems to be installed quickly and cost effectively.

DIGI-5 is a collaboratively developed technology that is licensed by the Linear Home Technology Group and is being initially integrated on a Linear group-wide basis, targeted to expand market and consumer acceptance of such systems.

Features

- Single Source Inputs (connected to D5IP Source Input Plate)
- Four Zone Output (connected to D5KP Keypad and Amplifier)
- Source Loop-Outs (used for expanded zone system)
- Structure Wiring Universal Mount: Adaptable to all manufacturers tubs

D5SH Accessories

- D5PS Digital Audio Power Supply (required)
- D5PSE Digital Audio Power Supply (export 240VAC model)
- D5KP Amplified Keypad (required)
- D5IP Source Input Wall Plate (required)
- D5MR Slim-line IR Remote
- D5LR Learning Remote Control

Defining Terms

Zone

A Zone is defined as an area of the house that has separate source selection capabilities from all other areas of the house. Typically, a zone is comprised of a single room, but it is possible for a zone to spread across multiple rooms (kitchen/dining room, master bedroom/master bath) or for multiple zones to be contained in one room (game room/bar area or multiple zones in the yard).

Local Source / Source

A Source is any audio (or audio/video) device that is connected to the D5IP source input plates that are connected to the D5SH. Any Source can be heard in any zone in the system.

2. System Design Overview/Applications

Planning

Before installing the D5SH, it is essential to have a detailed and accurate system design. The first step to a good design is to map the system. It is advisable to mark up a copy of the house floor plan with speaker, keypad and equipment locations, etc. Make sure that all locations are decided upon before pre-wiring so that all necessary wiring and installation hardware is in place.

It is essential that ALL system components are accounted for prior to the pre-wire stage. After establishing design goals, make a detailed list of all components. Include source equipment, keypad, expansion hubs, local source wall plates, IR emitters, etc.

Pre-Construction

In a pre-construction installation, walls and ceilings are open with no drywall installed. This is desirable and allows the installer greater access than in retro-fit applications. Before actually running any wire or cable, take the time to look around each room or area of the house and plan your wire paths for maximum efficiency. Look for routes through uncluttered parts of the stud wall or ceiling that allow you to group all low-voltage (video, speaker wires, CAT-5, telephone, etc.) wires wherever possible. It is a good practice to label both ends of all cables and to protect wires by tying a plastic bag over the ends.

Note: Do not run low-voltage wires closer than 12" from high-voltage wires. If necessary, cross low-voltage wires at a 90° angle to prevent interference.

Retro-Fit Wiring/ Post Construction

Retro-fit installations are more difficult to complete than pre-construction because walls and ceilings are intact. Typically wires must be fished into position through walls, floors and ceilings. Holes must be cut; speakers mounted directly in the ceiling or walls with no rough-in brackets and keypads and local source wall plates must be mounted in existing drywall.

Pre-Wiring

D5SH Digital Audio Distribution Hub to D5KP Amplifier Keypad

The D5SH and all associated components are wired using CAT-5 terminated to the T-568A Wiring Standard (Figure 2.1). When pre-wiring, run lengths of CAT-5 from the pre-determined D5SH Digital Audio Distribution Hub location (the "head-end") to each Amplifier Keypad location. The CAT-5 routes all audio, power, IR and status information needed for full system operation. Use a 110 Punch-down tool to connect the CAT-5 wiring to the Digital Audio Distribution Hub.

Note: For maximum performance over long runs (more than 150 ft) run an additional 16AWG 2-conductor wire for external power.

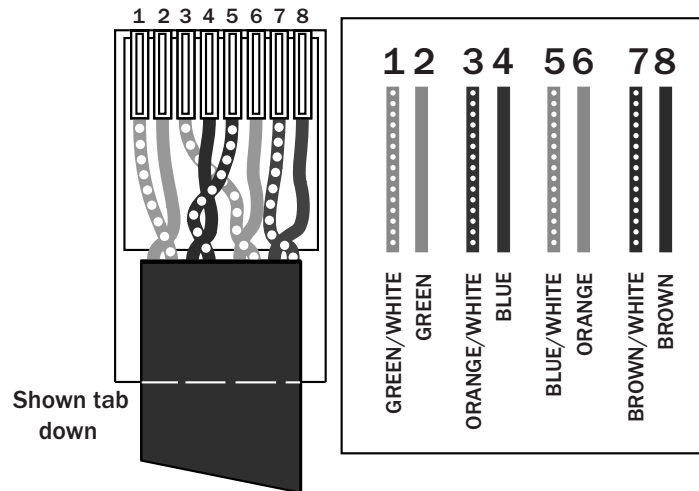


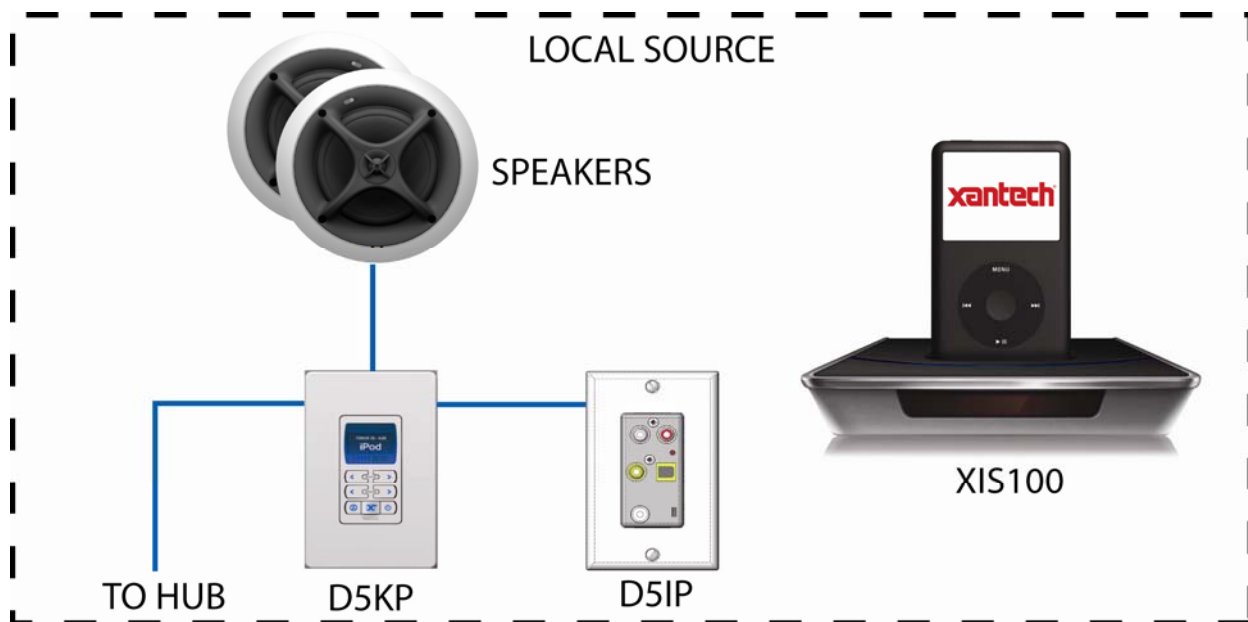
Figure 2.1: T-568A Wiring Standard

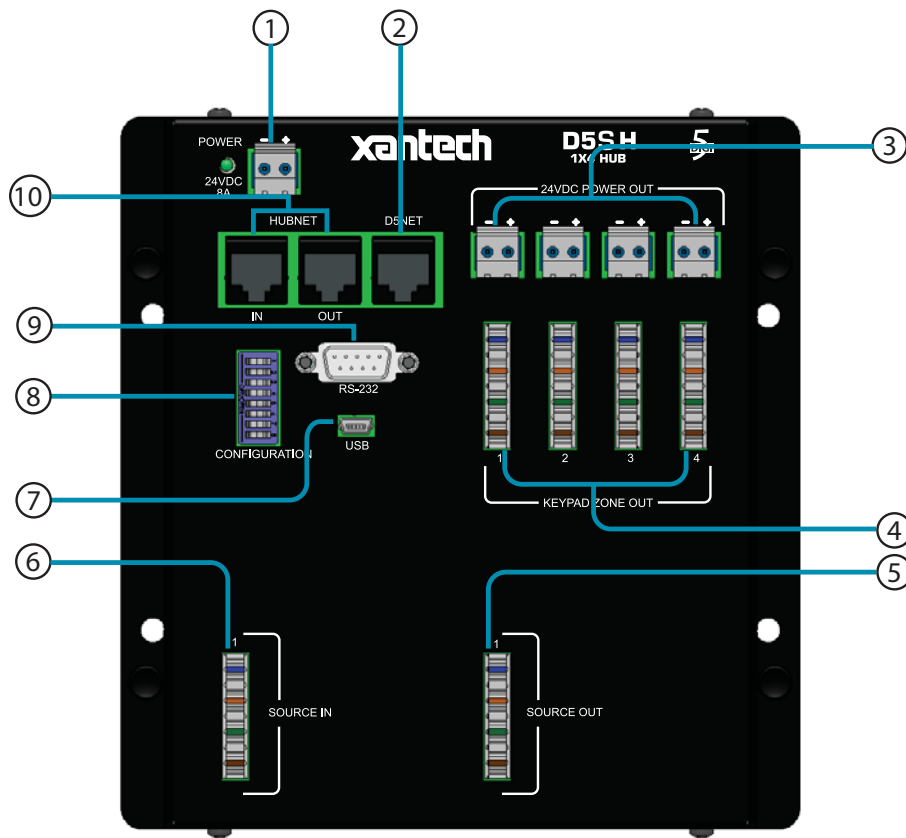
D5KP Amplifier Keypad to Speakers

Run 16AWG 2-conductor stranded copper speaker wire between the D5KP Amplifier Keypad locations and speaker locations.

D5IP Local Sources to the D5KP Amplifier Keypad

Local sources are only available within the area that they are installed. They will not be available to other areas of the house as they are not distributed by the D5RH, D5SH, or D5SH4. Run lengths of CAT-5 from any local (in-room) source to the Amplifier Keypad located in that area. The D5KP must be connected to an external power supply or a distribution hub (for power).





Connector	Function
1 Power Input	Main system power from the D5PS1 is connected to this terminal. An LED indicates if the system power is 'on'.
2 D5NET	Control/Status Link to additional Digital Audio Distribution Hubs. For expansion systems.
3 Keypad Hi-Power Outputs	Optional connection to D5KP. Used to supply more power to increase dynamic performance and extend distance. See Auxiliary Power Connection section.
4 Keypad Zones	Connects to D5KP Keypad Amplifier using CAT-5 wiring.
5 Source Outputs	Connects to 'Source Inputs' on additional Digital Audio Distribution Hubs. Uses CAT-5 wiring. For expansion systems.
6 Source Inputs	Connects to D5IP Source Input plates using CAT-5 wiring.
7 USB Port	For firmware updates.
8 Configuration DIP Switches	Use for configuring keypad pairing, UNIT ID, and future configurations.
9 RS232 Port	For RS232 communication to control and query the Digital Audio Distribution Hub from external RS232 controller.
10 HUB NET LOOP	For communication to expanded hubs.

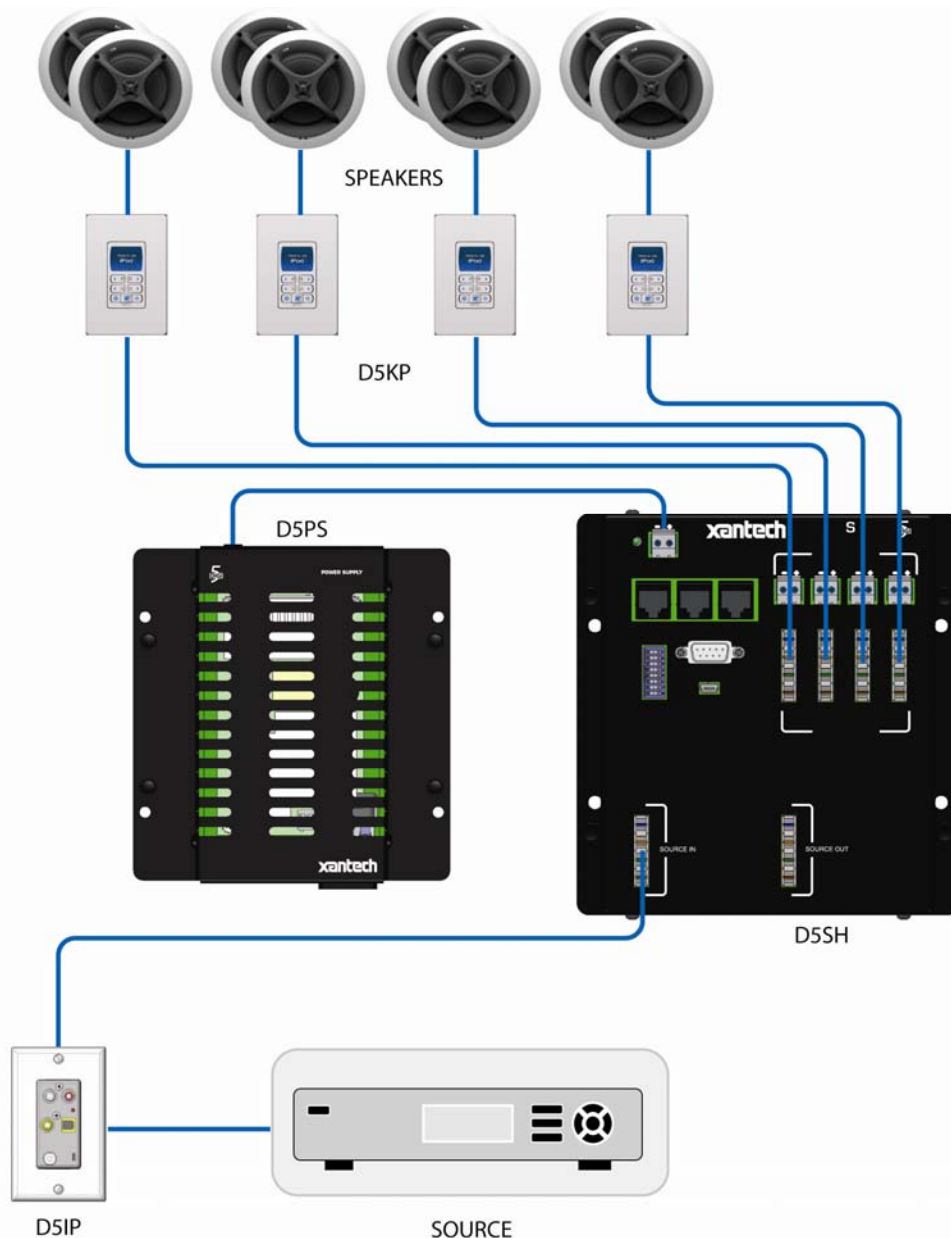
Applications

There are three typical system applications when installing the D5SH. These options can be combined throughout a system depending on the design of the system:

- 1 Basic Single Source, 4 Zone System
- 2 Expanded Single Source, 8 Zone System
- 3 Expanded Single Source, 32 Zone System

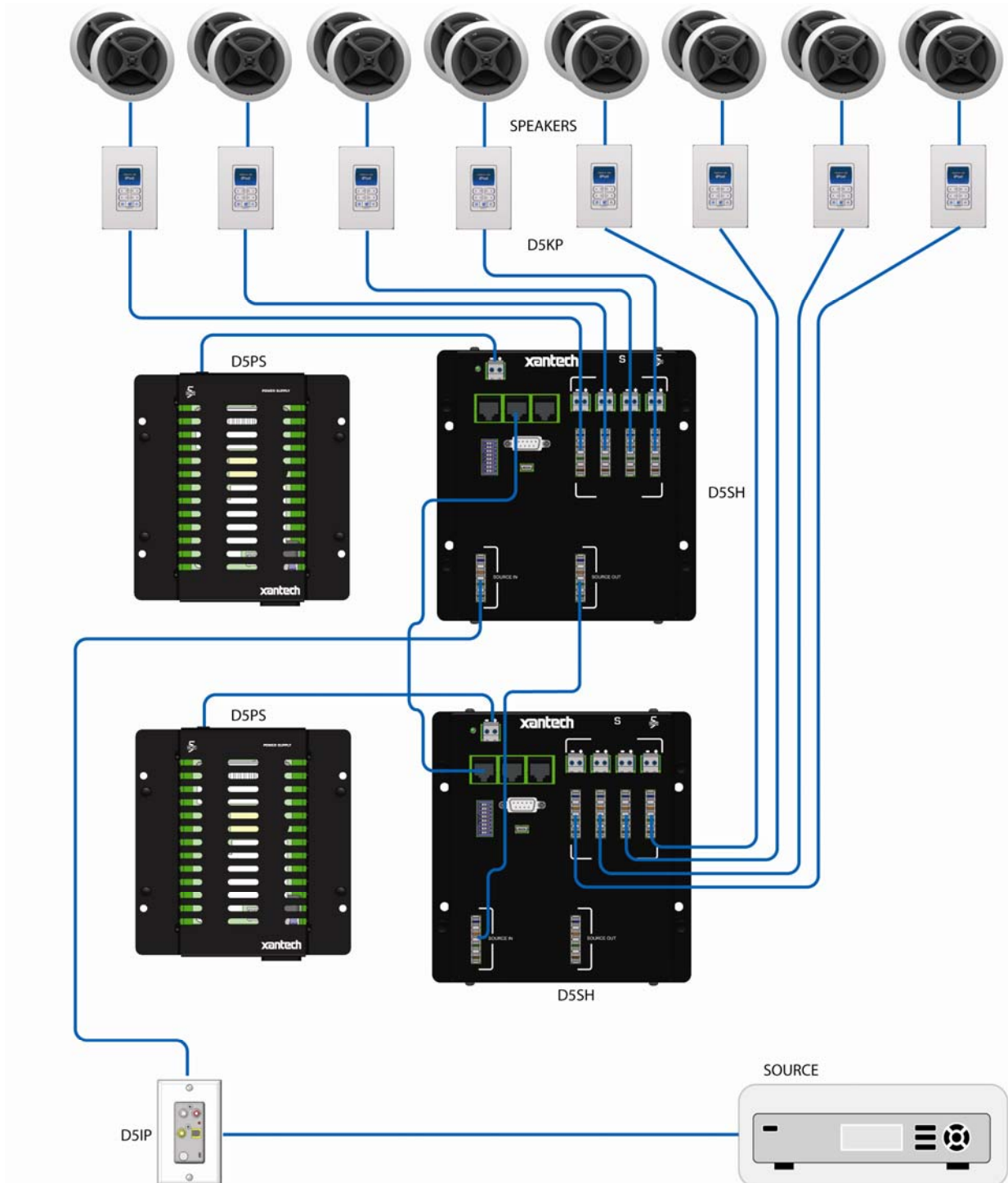
Basic Single Source, 4 Zone System

This system contains (1) D5IP, (4) D5KP, (1) D5SH, and (1) D5PS. An audio source is connected to the Digital Audio Distribution Hub via the D5IP. Four D5KP keypads are connected to the Digital Audio Distribution Hub. Once all wiring has been made and verified, the D5PS power supply connects to the D5SH Digital Audio Distribution Hub to power the system.



Expanded Single Source, 8 Zone System

This system contains (1) D5IP, (8) D5KP, (2) D5SH, and (2) D5PS. An audio source is connected to the Digital Audio Distribution Hub via D5IP. Eight D5KP keypads are connected to the Digital Audio Distribution Hubs. Once all wiring has been made and verified, the two D5PS power supply connects to the two D5SH Digital Audio Distribution Hubs to power the system. The 'SOURCE OUT' on the D5SH connects to the next D5SH's 'SOURCE IN'. The same applies with the 'HUBNET' connections.



Expanded 4 Source, 32 Zone System

This system contains (1) D5IP, (32) D5KP, (8) D5SH, and (8) D5PS.

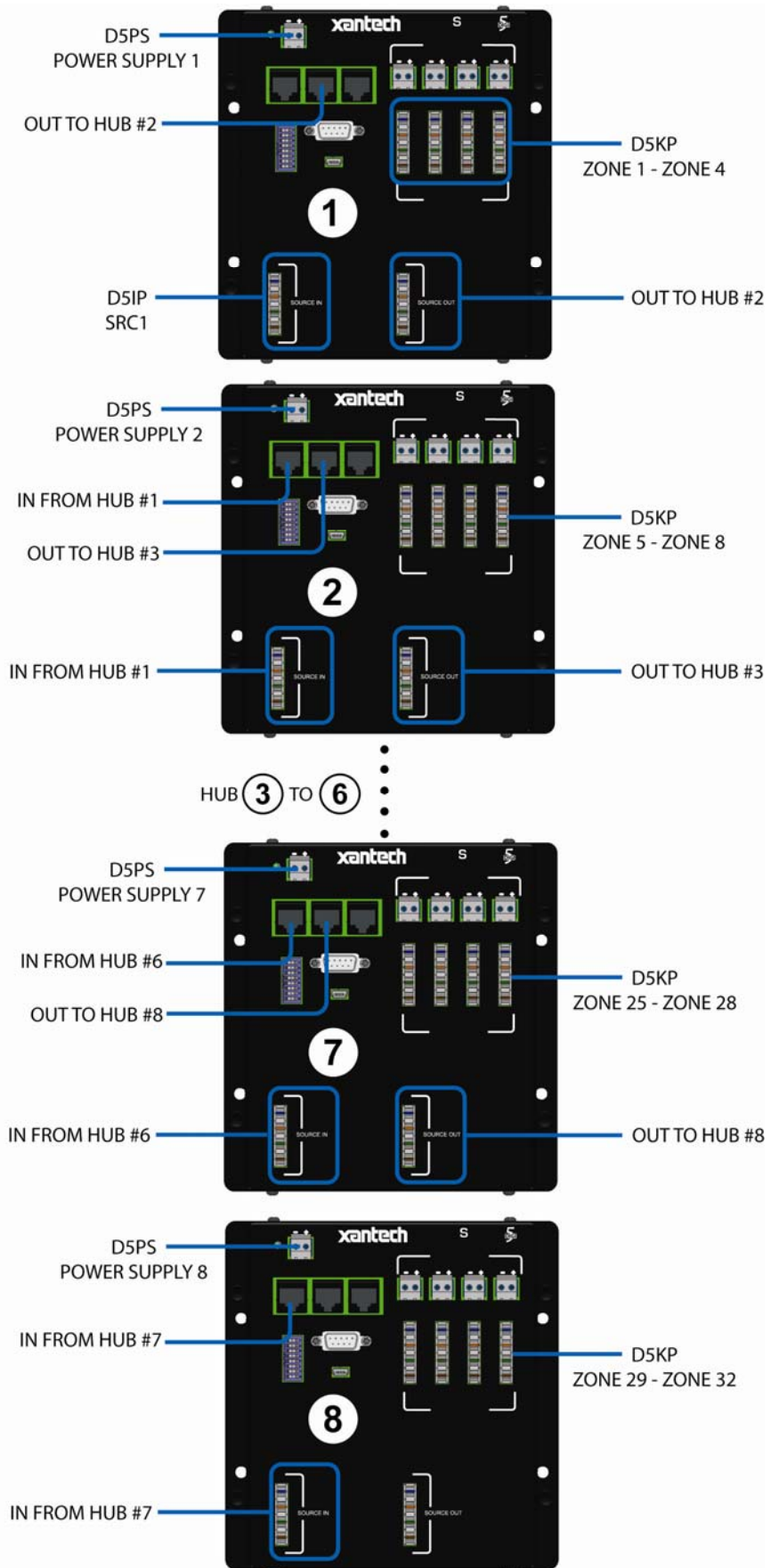
An audio source is connected to the Digital Audio Distribution Hub via D5IP.

Thirty-two D5KP keypads are connected to the Digital Audio Distribution Hubs.

Once all wiring has been made and verified, each D5SH Digital Distribution Hub has a D5PS Power Supply connected to it.

The 'SOURCE OUT' on the D5SH connects to the next D5SH's 'SOURCE IN'.

The same applies with the 'HUBNET' connections.



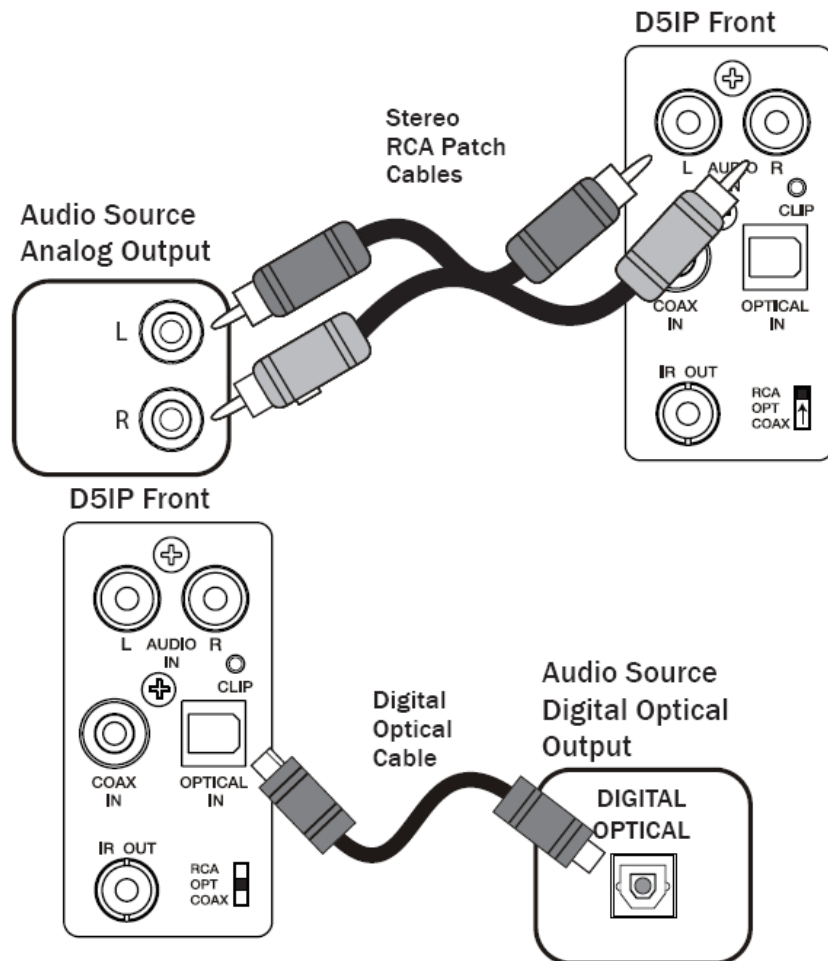
3. Connections

D5IP Source Input Wall Plate

A D5IP Source Input Wall Plate is required to add a Source to the Digital Distribution Hub. A run of CAT-5 terminated to T-568A standard (see Figure 2.1) is required between the D5SH Digital Audio Distribution Hub and the location designated for the D5IP. Connections between a source component and the D5IP are detailed in Figure 3.1 to Figure 3.2.

NOTE:

- (1) Set RCA/OPT/COAX switch to RCA (up) position when using Analog Left and Right connections.
- (2) Set RCA/OPT/COAX switch to OPT (middle) position when using Digital Audio connections with optical cables.
- (3) Set RCA/OPT/COAX switch to COAX (down) position when using Digital Audio connections with coaxial cables.



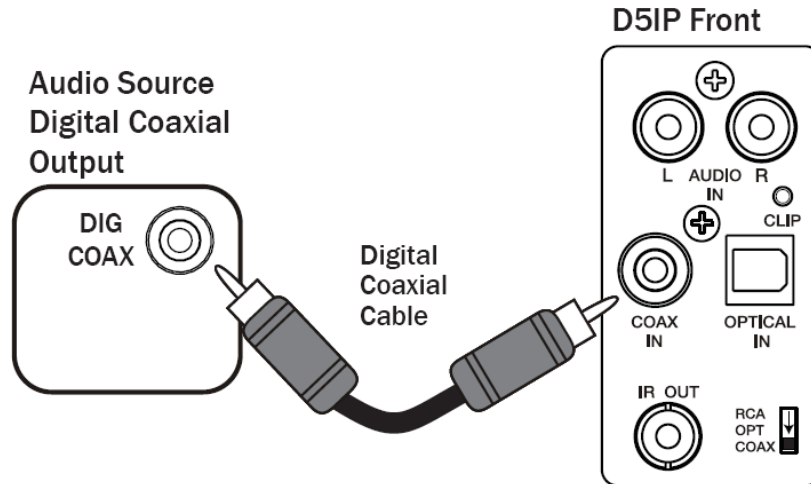


Figure 3.1 to Figure 3.2: Local Source to D5IP Connections

NOTE: Multi-channel digital audio formats (5.1, 7.1 etc.) are not supported by the D5IP and D5SH. However, many audio/video sources allow you to change the digital output to PCM Stereo. In most cases this will allow multi-channel audio sources to output a “summed” stereo signal through the digital output. Consult the audio/video source manual for details.

NOTE: Some audio sources which utilize a digital output require that you enable the digital output before it will function. If there is no audio present, check the setup menu of the audio source to confirm that the digital output is enabled.

IR OUT

Connect a standard IR Emitter (283D emitter, for example) from the IR OUT port on the front of the D5IP to the IR receiver on the front of the audio source (see Figure 3.4). For sources that have an IR Input port on the back of the unit, use a 3.5mm to 3.5mm mono interconnect cable instead (see Figure 3.4).

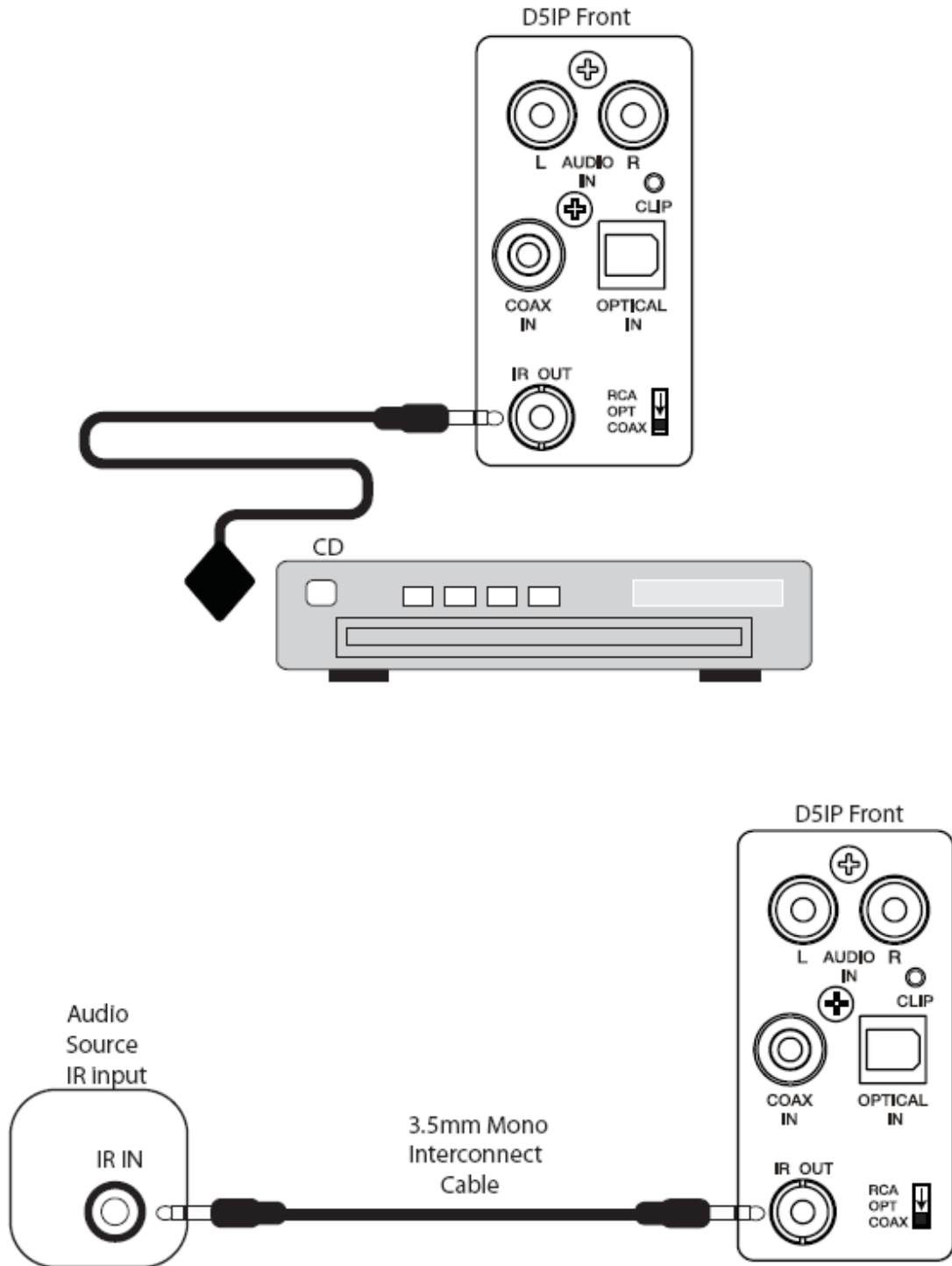


Figure 3.4: IR Out to Source Connections

Auxiliary Power Connector (AUX POWER OUT)

For wire runs over 150', it is recommended to run an additional 16 AWG/2-conductor wire from the head-end location to the Amplified Keypad locations. This will allow the AUX POWER OUT terminals to supply additional power to the Amplifier Keypads to compensate for the additional distance. For wire runs over 300', 16 AWG/2 conductor wire is required. The maximum wire run using CAT-5 and 16 AWG/2-conductor is 600'. Make all connections between the D5SH and the D5KP Amplifier Keypad as previously described, and then make the aux power connections described below.

To make connections:

- 1 Ensure that system power is OFF!
- 2 Strip the ends of the 16 AWG wire 1/4" on both ends of the wire run.
- 3 Remove the terminal strip from the AUX POWER OUT connector on the D5SH.
- 4 Loosen the screws for the appropriate zone's terminal pairs on the terminal strip.
- 5 Insert the wires into the terminal strip, paying close attention to polarity (+/-).
- 6 Tighten the screws on the terminal strip.
- 7 Remove the terminal strip from the PWR IN connector of the D5KP.
- 8 Loosen the screws on the D5KP's PWR IN terminal.
- 9 Insert the wires into the terminal, paying close attention to polarity (+/-).
- 10 Tighten the screws on the D5KP's PWR IN terminal.
- 11 Connect the terminal strip back onto the AUX POWER OUT connector on the D5SH.

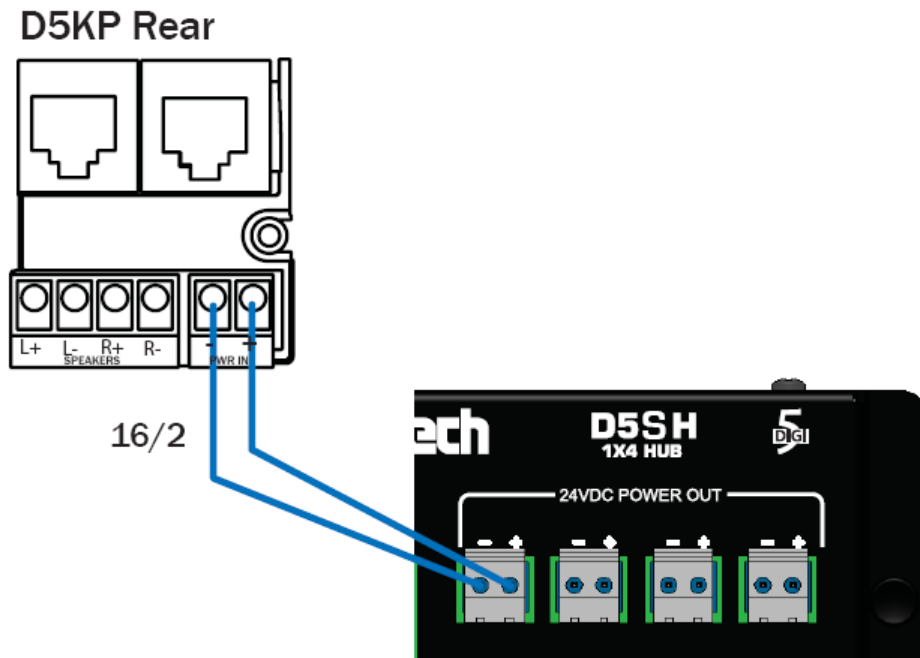


Figure 3.5: AUX POWER OUT Connections

USB Port (USB IN)

The USB IN port is designed to allow upgrades to the D5SH's firmware.

D5KP Speaker Connections

The D5RH routes digital audio to connected D5KP Amplifier Keypad where the audio is amplified and sent to in-room speakers.

WARNING! The D5KP's amplifier is capable of powering a single pair of 8-6 Ohm speakers. DO NOT connect speakers with a rating of less than 6 Ohms! DO NOT connect more than one speaker to either speaker connector of the D5KP. In doing this, damage to the D5KP may occur and will void the products warranty.

To connect speakers to D5KP Amplifier Keypad:

- 1 Ensure that system power is OFF!
- 2 Remove the SPEAKER CONNECTOR from the D5KP Amplifier Keypad
- 3 Strip speaker wire back 1/4"
- 4 Loosen speaker terminal screws on the speaker connectors
- 5 Insert speaker wires into terminals making sure to maintain +/- polarity
- 6 Tighten screws on speaker terminals
- 7 Re-connect the terminal strip to the SPEAKER CONNECTOR on the D5KP Amplifier Keypad
- 8 Connect speaker wires to the room speakers maintaining correct polarity

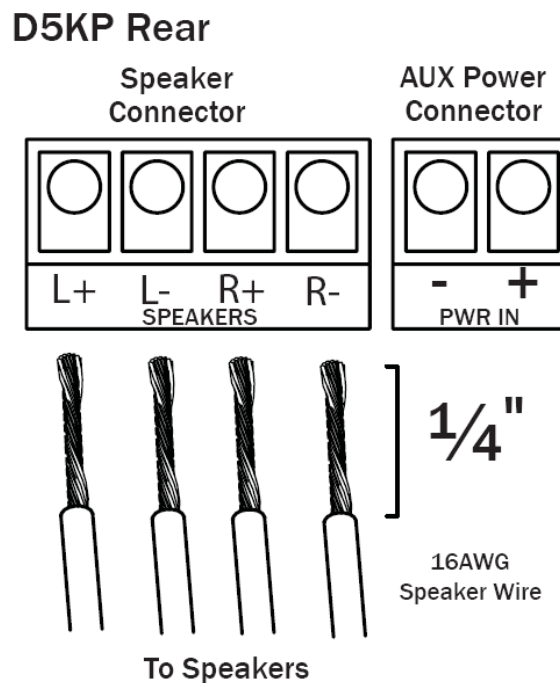


Figure 3.6: Speaker Connections

4. Settings & Operation

DIP Switch Settings

There is a single DIP switch on the front that must be set prior to operation for:

- MASTER/SLAVE
- UNIT ID
- KEYPAD PAIRING

MASTER/SLAVE

The D5SH4 can be selected as a master or slave unit. This configuration is reserved for future upgrades. Default setting is 'OFF'

	MASTER	SLAVE
SWITCH 1	ON	OFF

UNIT ID (HUB NUMBER)

Each D5SH4 has a corresponding DIP switch setting relative to the other chassis.

To set UNIT ID DIP switches:

1. Correctly identify which chassis controls the associated zones.
2. Assign a unique unit ID based on the silkscreen on the rear panel.
3. Repeat this process for the each other expansion chassis.

UNIT ID	1	2	3	4	5	6	7
SWITCH 2	OFF	OFF	OFF	OFF	ON	ON	ON
SWITCH 3	OFF	OFF	ON	ON	OFF	ON	ON
SWITCH 4	OFF	ON	OFF	ON	OFF	OFF	ON

KEYPAD PAIRING

The KEYPAD PAIRING DIP switches allow each of the zones to be paired or grouped with any other zone. Any zone that is in the UP position will be paired with any other zone that is also placed in the UP position. This feature is useful to create large "party" zones where combined areas of the house share audio and system control.

	DEFAULT	PAIRED
SWITCH 5	OFF	ON
SWITCH 6	OFF	ON
SWITCH 7	OFF	ON
SWITCH 8	OFF	ON

5. Troubleshooting

Table 5-1 provides troubleshooting information for the D5XH Digital Audio Router.

Audio

Symptom	Possible Cause	Solution
No audio present in a specific zone	1. Source not playing	Press Play, turn ON, etc.
	2. Zone not ON	Press "Power" on the D5KP
	3. Zone volume turned all the way down	Increase volume
	4. Speakers in room miswired or defective, or D5KP miswired	a. Test known good speaker at D5KP speaker connector b. Verify connections
No audio from specific source	Digital audio output not enabled	Check setup menu and confirm digital audio output is enabled
	Multi-channel digital audio formats (5.1, 7.1 etc.) are not supported by the D5IP, D5RH, etc.	Change digital Output to PCM Stereo
	Incorrect audio format selection.	Check RCA/OPT/COAX selection switch on D5IP for proper selection.
No audio present in any zone	1. See above	Perform steps above
	2. Digital source is outputting multi-channel audio format (5.1, 7.1, etc.)	Select PCM Stereo output on source component. Consult source's manual for details.
	3. Digital output not enabled on source	Enable digital output through source's menu. Set to PCM stereo. Consult source's manual for details.
Hum or buzz through system speakers	1. Ground loop	Ensure proper grounding using a three prong grounded AC outlet.
	2. Receiver/Amplifier level too high	Reduce level
Poor Audio quality	1. Clipping or distortion	Adjust GAIN settings
	2. Speaker out of phase	Carefully check polarity of each speaker
	3. Incorrect assignment of left/right source RCA cables or speaker cables	Isolate to source or room and correct

Specifications

Power Input	24VDC / 8 Amps
Sampling Frequency	48kHz
Audio Resolution	24 Bit
Signal to Noise Ratio	94dB
Frequency Response	20Hz-20kHz +/- 0.1dB

Dimensions	
H x W x D	6 1/2" x 6 3/4" x 1 1/2" (16.5 cm x 17.1 cm x 3.8 cm)
Weight	2.46lbs (1.1kg) Shipping Weight 1.80lbs (0.8kg) Unit Weight

Xantech Limited Warranty

(Effective for products sold after July 1, 2006)

Xantech Corporation ("Xantech") warrants to the holder of a valid proof of purchase as the first end-user purchaser ("You"), its products to be free from defects in materials and workmanship for the periods specified below from the date of purchase. This limited warranty extends only to You for product purchased and used in the United States of America. For product purchased outside of the United States of America, You must contact the Xantech authorized distributor in your region for warranty services. Product is not intended for end user installation. If within the applicable warranty period above You discover such item was not as warranted above and You promptly notify Xantech in writing, Xantech shall repair or replace the items at its option. Xantech may elect which remedy or combination of remedies to provide in its sole discretion. Xantech may use functionally equivalent reconditioned/refurbished/pre-owned or new products or parts under this limited warranty. This warranty shall not apply (a) to product which shall have been installed by other than an authorized Xantech installer, (b) to installed product which is not installed to Xantech's specifications, (c) to product which shall have been repaired or altered by others than Xantech, (d) to charges for installation or set up or adjustment of customer controls, (e) to product that has suffered normal cosmetic deterioration (f) to product which shall have been subjected to negligence, misuse, abuse, accident, or damage by circumstances beyond Xantech's control, including, but not limited to, lightning, flood, electrical surge, tornado, earthquake, or any other catastrophic events beyond Xantech's control, or (g) to product which shall have been subjected to improper operation, connected equipment failure or malfunction, inadequate packing or shipping damage, maintenance or storage, or to other than normal use of service. The foregoing warranties do not cover reimbursement for labor, transportation, shipping, removal, installation, or other expenses which may be incurred in connection with repair or replacement. All claims for product shipping damage must be processed within 3 days of receipt by You.

A Xantech Return Authorization (RA) must be obtained from Xantech by You, your installer or your distributor for Product covered under this warranty. Covered product must be sent to Xantech together with proof of purchase, RA number, prepaid and insured to Xantech. Freight collect shipments will be refused. Risk of loss or damage in transit is borne by the sender. Xantech's warranty does not cover Products which have been received improperly packaged, altered, or physically damaged. Products will be inspected upon receipt.

Except as may be expressly provided and authorized in writing by Xantech, Xantech shall not be subject to any other obligations or liabilities whatsoever with respect to equipment manufactured or sold by Xantech or services rendered by Xantech.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESSED AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

ATTENTION: TO OUR VALUED CONSUMERS

To insure that consumers obtain quality pre-sale and after-sale support and service, Xantech products are sold exclusively through authorized dealers and authorized distributors. The warranties on Xantech products are NOT VALID if the products have been purchased from an unauthorized dealer or distributor. In order to determine if your Xantech re-seller is authorized, please call Xantech (800) 843 - 5465.

XANTECH PRODUCT (go to Xantech.com/warranty for model numbers)	WARRANTY DURATION
IR Receivers and IR Emitters	Limited Lifetime
Remote Control Switchers	Limited Lifetime
Modules and Connecting Blocks	Limited Lifetime
Accessories	Limited Lifetime
Speakers	Limited Lifetime
Volume Controls and Speaker Selectors	5 year Limited
DIGI-5, MRC, BX, ZPR and Commercial Products	2 year Limited
Amplifiers	2 year Limited
Control Interfaces	2 year Limited
Hand Held Remote Controls	1 year Limited
SPLCD Product	1 year Limited
Source Components, XIS100	1 year Limited

Xantech Corporation

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