



USER GUIDE



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XLR Breakout Panels

P/N 991014A, 991014B, 991014C, 991014D, 991014E

Revision 1.0 - 04/23

Welcome to StudioHub, the original CAT-5 audio cabling solution.

The CAT-5 cable is amazingly versatile. While its most common application is computer networking, it also makes an ideal audio cable. The RJ45 connector is compact and easy to use. The twisted wiring pairs are perfect for balanced analog or digital (AES/EBU) audio.

StudioHub pioneered this idea over 20 years ago and quickly became the de facto standard. Today, thousands of radio plants around the world rely on StudioHub wiring infrastructure. With CAT-5 rated shielded twisted pair cables, StudioHub+ efficiently routes both analog and digital signals throughout a facility. The StudioHub+ system features pre-made source cables for all types of studio gear, quick-connect blocks, and peripheral amplifiers to easily harness all studio gear together.

On-site wiring time is dramatically reduced due to the true plug and play nature of StudioHub+, which includes numerous accessories. These “spoke” products include “MatchJack” balancing amplifiers, mic pre-amp, headphone amp and various switching and adapter plates. Every system component connects instantly via shielded RJ-45 jacks, and all peripheral products are Phantom powered with the built in “DC-link” system using extra pairs in the CAT-5 cables.

Every item with the StudioHub logo – including the XLR Breakout Panel – is designed to be easy to understand, easy to use, and is engineered and manufactured to the highest quality standards to deliver pristine audio for many years.

Our promise and guarantee.

We know you'll love your XLR Breakout Panel, but the universe is a strange place, so it's always possible that you won't. That's why we give you 30 days to bond with your panel. If the two of you can't agree on whether a tomato is a fruit or a vegetable, we'll buy it back.

Plus, every StudioHub hardware device is warranted to be free from defects in parts and workmanship for two full years after you purchase it. If a device fails within this time period, Angry Audio (the makers of StudioHub) will, at its discretion, repair or replace it so long as you let us know of the failure within the warranty period and can provide proof of purchase in the form of a dated sales receipt. You can call us at +1 615-763-3033, or reach us online at www.angryaudio.com/contact.

Making a good first impression.

When you unbox your Breakout Panel, we really hope it makes a good first impression and that you take a moment to appreciate the lengths we've gone to in order to create a “built for broadcast” product. All of our products are over-engineered to provide long-term reliability and guaranteed RFI immunity.

Some of this is apparent - such as the rugged powder-coated steel chassis - but much of this goodness is invisible, like the premium components used in the audio path. Even if you can't see it, you'll hear it!

A word or two about safety.

Most people intuitively know how to be safe. Putting a screwdriver into a power socket – that's a no-no. Drinking anti-freeze: sure, it tastes great, but it turns your nervous system into a Slurpee. Juggling chainsaws – they'll be calling you “Stumpy.” However, in order to indemnify ourselves (that's a legal term that means “We warned you!”), please bear with us for a few short words on how not to lose a limb with your new StudioHub+ equipment.

StudioHub+ devices are intended to be used by qualified personnel only. To avoid electric shock, do not open the unit or attempt to perform any servicing unless you are qualified to do so.



The XLR Breakout panel is a passive electrical device which contains no power supply. However, electrical voltages are present during operation. Do not operate the unit with the cover removed, expose it to rain or moisture, or place it inside a jello mold to prank your co-workers. Any electronic device can fail without warning; do not use this product in applications where a life threatening condition could result due to failure.

And now, since we have space left to fill, a jaunty presentation of our favorite warnings for your dining and dancing pleasure: Do not fold, spindle or mutilate. For topical use only; do not ingest. This end up. Team lift only. Do not block the aisle. In the event of an emergency, be aware that the nearest exit may be behind you. Rinse, lather, repeat. May cause drowsiness. Do not gaff (look it up).

If some are good, more are better

StudioHub+ adapters marry RJ45 connectors with CAT cabling standards. Over the years they've become the standard for installing audio cabling in broadcast studios. The iconic RJ45-to-XLR cables are ubiquitous in studios around the world. (But you already know this, or you wouldn't have bought the XLR Breakout panel! Bad writer; no cookie. Moving on.) Engineers like StudioHub+ adapters because they're easy to use and maintain, drastically cut the amount of time needed to wire a broadcast facility, and produce a highly satisfying "snick" sound when they click together.

While individual StudioHub+ adapters are perfect for most studios, sometimes you need to deal with a large quantity of signals, such as might be found in live venues, installed sound, television plants, remote trucks, recording studios, or Jeff Bezos' secret orbital platform. In these applications, a more high-density approach might be preferred.



The StudioHub+ XLR Breakout Panel fills the bill nicely, in a professional rack-mount package that provides 16 XLR connections on the front panel, and three different connection options on the back panel – StudioHub+ connections for analog / digital signals in both stereo and mono breakout formats, AES72 Type 4 ("QTP") connections, and AES59 25-pin D-sub connectors each carrying 8 audio channels.

Because every installation is different, the XLR Breakout Panel comes in several different flavors, just like your favorite ice cream. Unlike ice cream, however, you don't have to keep your XLR Breakout Panel in the freezer – that would just be inconvenient. The five flavors are:

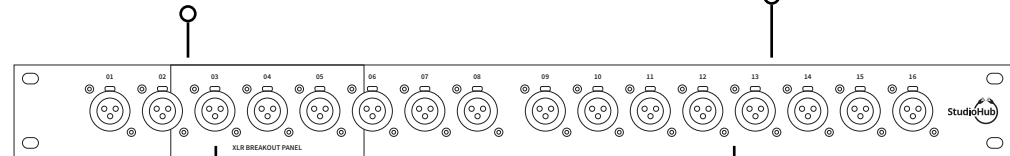
- p/n 991014A (XLR_16F), with 16 female XLR connectors ideal for large numbers of audio inputs.
- p/n 991014B (XLR_16M), with 16 Male XLR connectors for multiple program outputs or device feeds.
- p/n 991014C (XLR_8FM) splits the difference with 8 Female and 8 Male XLR connectors.
- p/n 991014A (XLR_4FM). Two logical groups, with 4 Female + 4 Male XLR connectors per group.
- p/n 991014E (XLR_DELETE). Blank front panel without XLR connections. RJ45, AES59 and AES72 connections on the rear panel only - perfect for keeping studio DJs' grubby little paws off the connections.

Now let's take a look at all the gozintas and gozoutas.

So...many...connectors...

Each XLR Breakout panel has two groups of 8 XLR connections on the front, which correspond to a set of RJ45 and AES59 connectors on the rear panel.

Models are available with 16 XLR-male, 16 XLR-female, 8 each XLR-male and XLR-female, or two groups of 4 male & 4 female each.



This area has a stylish blue paint panel for added pizzazz in the rack.

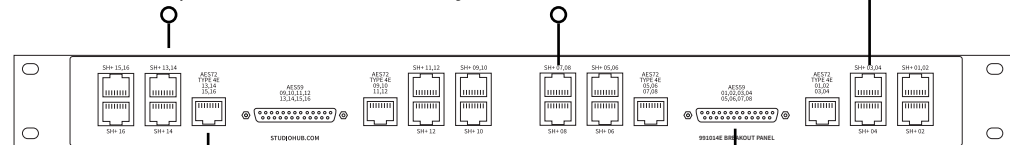
There's really nothing more to say here, but we're OCD and the callouts have to be symmetrical.

And on the back: more connectors!

Each of the rear panel sections corresponds to the 8 XLRs on the front panel, with 4 audio connections per side.

For Stereo connections, the StudioHub+ jack at the top of the pair contains both L & R audio channels; bottom jack is not used.

For Mono connections, each StudioHub+ jack contains a separate mono channel.



Each group of 4 channels is aggregated on a single RJ45 for connection to AES72 Type 4E ("QTP") gear.

Each DB-25 connection carries 8 channels of audio in the AES59 "TASCAM" format.

Getting to know your Breakout Panel

Starting a new relationship is never easy, but a quiet evening at your favorite restaurant is a good way to begin. Your Breakout Panel will appreciate a chateaubriand for two and a glass of wine before you just start attaching cables willy-nilly. Your Breakout Panel has needs too, you know.

I/O is 1:1. The XLR Breakout Panel is a passive device translates one audio connection type to another, not a splitter or distribution amplifier. You can only make one set of input and output connections. Plugging in two sets of inputs will make your audio unhappy. Don't do that to your audio! It's only ever loved you and wanted the best for you.

Split personality. The Breakout Panel is divided into two sections, electrically speaking. Channels 01 – 08 comprise the first section; 09 – 16 comprise the second section. These sections are isolated from each other, and each section feeds its 8 signals to a discrete set of connections on the rear panel which are numbered identically for easy reference.

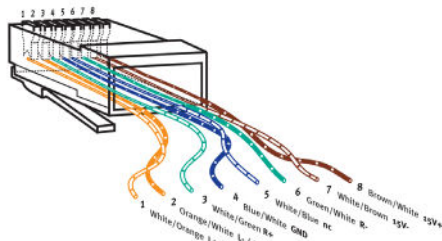
Analog audio or AES3? You can feed your Breakout Panel with either or both if you like, the Breakout Panel doesn't judge. Connect 16 digital signals, 16 analog mono signals, or 8 digital + 8 analog, 8 Mic + 4 stereo line, et cetera. It's more flexible than a bag of gummy worms during a heat wave.

Don't cross the streams! The StudioHub+ format places two audio pairs on each CAT5 cable, so channels 01/02 are paired as are 03/04, 05/06 etc. Do not mix analog and digital audio on the same pairs. Also be aware that the AES59 standard states that input and output audio signals should not be mixed on a single connector.

Know your pinouts. If you're new to the world of StudioHub+, you'll appreciate a pinout reference. The full reference is found at www.studiohub.com > Knowledge > White Papers, but here is the basic RJ45 diagram for your convenience:

StudioHub+ Universal Pinout Reference

StudioHub+ Pinout				
Channel	Color Pair	RJ-45 Pins	110 Pins	Ethernet
L+ / AES+	Wht/Org	1	3	TR+
L- / AES-	Org/Wht	2	4	TR-
R+	Wht/Grn	3	5	R+
R-	Grn/Wht	6	6	R-
nc	Wht/Blu	5	1	n/c
DC GND	Blu/Wht	4	2	n/c
15V-	Wht/Brn	7	7	n/c
15V+	Brn/Wht	8	8	n/c
Shield	Wht/Slit	Shield	9	x
Shield	Slit/Wht	Shield	10	x



Getting to know your Breakout Panel

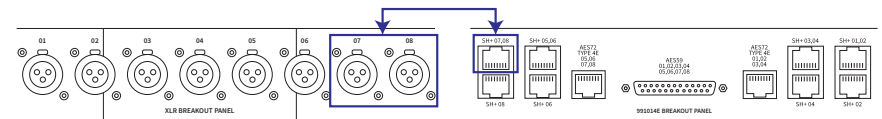
"Yeah, yeah; let's hook some stuff up!"

Example #1: Analog XLR <-> StudioHub+

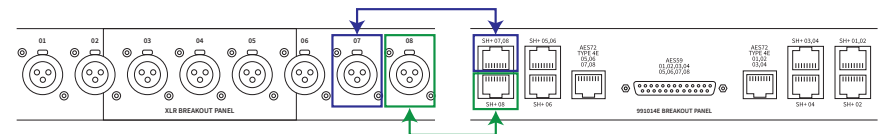
A common scenario is converting between XLR and StudioHub+ formats. When using the Breakout Panel for analog connections, it has a 16-mono / 8-stereo signal capacity.

All front- and rear-panel jacks are numbered, so connections made to front XLRs will exchange audio with the corresponding StudioHub+ jack on the rear.

This diagram below shows an Analog stereo connection. XLR 07 and 08 are sending left and right audio to the SH+ 07,08 jack. Or, the reverse: SH+ 07,08 sends audio to XLR 07 and 08.



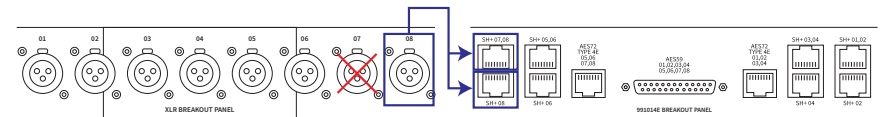
But what if you've got mono? (Eww... we should rephrase that.) The diagram below shows mono signals connected to channels 07 and 08. Again, this connection can send audio either way.



There's one more little trick you should know: even-numbered inputs are electrically connected to both StudioHub+ jacks on the rear-panel. So if you want to send a line-level mono signal from an XLR input to two different locations using StudioHub+, use an even-numbered input and the signal will be delivered to both the top and the bottom jacks in the pair.

In the diagram below:

- The top (SH+ 07,08) jack delivers the signal to RJ pins 3 & 6 (the Right stereo pair).
- The bottom (SH+ 08) jack delivers the signal to RJ pins 1 & 2 (the Left stereo pair).
- Even-numbered inputs cannot be used if you choose to employ a dual-mono configuration.

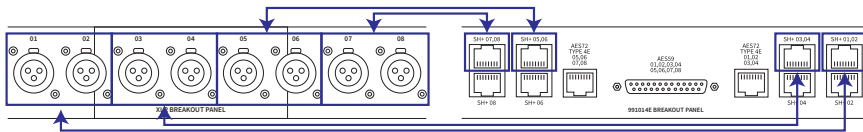


Let's try digital!

Example #2: Digital XLR <-> StudioHub+

The Breakout Panel can carry up to 16 AES3 digital signals at a time. As with analog, connections made to front XLRs exchange audio with the corresponding StudioHub+ jacks on the rear panel.

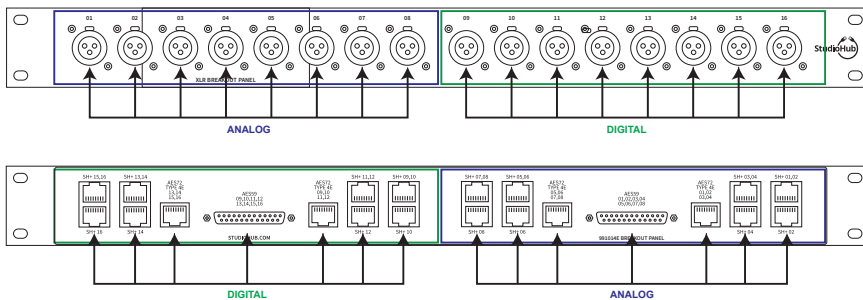
Unlike analog audio, AES3 makes no distinction between mono, stereo, or Googlephonic (the largest number of audio channels prior to infinity); it's just a digital signal. So all StudioHub+ outputs will use the top row of RJ45 jacks to supply two signals each. The bottom set of StudioHub+ jacks are not used.



Example #3: digital + analog together

Aside from being extraordinarily handsome and being able to make the perfect dry Martini, the Breakout Panel can also connect analog and digital signals at the same time. The Breakout Panel's two halves are electrically discrete, each half containing 8 signal paths. You can feed analog to one side and digital to the other, but you cannot mix them together in the same signal path, lest the grass wither and die and sun be blotted from the sky. (End-of-days stuff; you get the idea).

The diagram below shows front and back of a properly connected Breakout Panel using both line and AES3 signals.

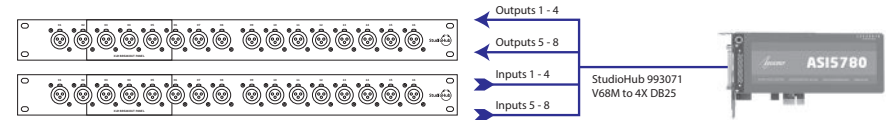


Using the Breakout Panel with AudioScience sound cards

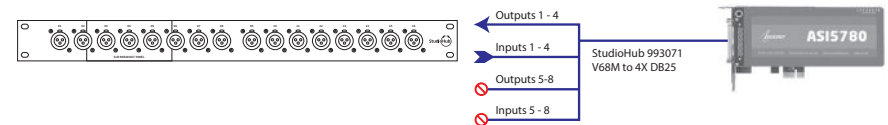
If you are a user of AudioScience sound cards with I/O via high-density V68M connectors, the XLR Breakout Panels provide a quick, simple plug-and-play method of converting audio and control connections to either XLR or StudioHub+ RJ45, using custom pre-made StudioHub connection cables. Here are a few examples.

ASI analog sound card connection

ASI cards that provide only analog I/O can be connected to two Breakout Panels using a StudioHub cable designed for this application (p/n 993071) to deliver 8x8 stereo I/O. The cable's four DB25 connectors mate with the DB25 ports provided on the back of each unit. (They like a little wine and candlelight for this.)



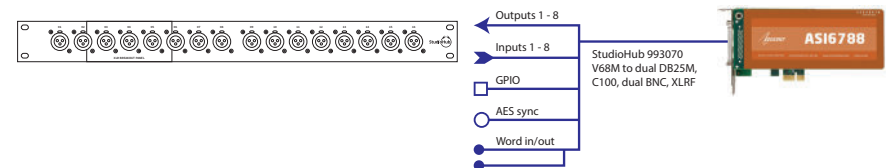
For ASI analog cards with only 4 channels of I/O, use the same StudioHub cable with a single Breakout Panel and disregard the second set of DB connectors.



ASI digital sound card connection

If you're using an ASI card that provides analog and AES/EBU I/O plus GPIO, there's a ready-made Breakout Panel solution for you as well. These cards have two V68M ports: one for analog signals; the other for digital and control.

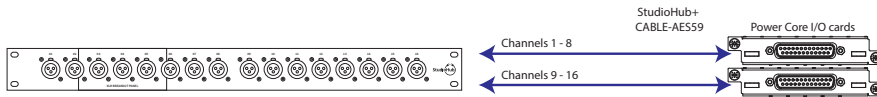
The StudioHub cable designed for this application (p/n 993070) mates with the card's AES/EBU port and connects 8 AE3 channels to the Breakout Panel with two DB25 connectors. An XLR for AES clock sync, dual BNC for Word clock in/out, and GPIO on C100 connector are provided.



Using the Breakout Panel with Lawo Power Core I/O cards

The XLR Breakout Panels provide a quick, simple plug-and-play method of converting audio and control connections from Lawo Power Core plug-in I/O cards to either XLR or StudioHub+ RJ45.

To accomplish this you'll use a (2) StudioHub+ DB-25M-to-DB-25M cable, p/n CABLE-AES59, to connect the Breakout Panel to the Power Core's Line or AES3 I/O cards.



There are several different Power Core analog and digital I/O cards, but each of them uses the same AES-59 connector and supplies 8 channels of I/O, so connection is identical for all varieties. However, due to standards disallowing mixing of analog and digital signals on the same connection, you will use a different XLR Breakout Panel depending on signal type:

- To connect 16 AES3 digital signals, use Breakout Panel p/n XLR_4FM.
- To connection 16 Line signals, use Breakout Panel p/n XLR_8FM.

Engineering can be stressful

Here is a basket of puppies to help you unwind.



Specifications.

Riveting data about your gadget.

Part Numbers

XLR Breakout Panel XLR_16F
 XLR Breakout Panel XLR_16M
 XLR Breakout Panel XLR_8FM
 XLR Breakout Panel XLR_4FM
 Breakout Panel XLR_DELETE

Part No. 991014A
 Part No. 991014B
 Part No. 991014C
 Part No. 991014A
 Part No. 991014E

Front Panel Connections

Inputs
 Outputs

Female +4dBu balanced XLR
 Male +4dBu balanced XLR

Rear Panel Connections

StudioHub+ I/O
 AES59 I/O
 AES72 I/O

RJ45F, StudioHub+ wiring standard
 DB25F, TASCAM wiring standard
 RJ45F, AES72 Type 4E wiring standard

Power and Environmental

Power Consumption
 Operating Temperature
 Storage Temperature
 Relative Humidity

0 VAC (unpowered)
 0o to 40o C (32o to 104o F)
 -20o to 45o C (-4o to 113o F)
 0% to 90% non-condensing

Product Weight & Dimensions

Width x depth x height
 Weight

19 x 3.5 x 1.75 in., 48.26 x 8.9 x 4.45 cm.
 3.5 pounds, 1.6 kilograms

Shipping Weight & Dimensions

Weight
 Length x width x height

4 pounds, 1.8 kilograms
 20 x 6 x 6 in., 50.8 x 15.25 x 15.25 cm.

Box includes:

Breakout Panel
 Our eternal gratitude

In The U.S.

In the U.S., this device complies with the limits for a Class A computer device as specified by FCC Rules, Part 15, Subpart J, which are designed to provide reasonable protection against such interference when this type of equipment is operated in a commercial environment.

In Canada

In Canada, this device does not exceed the Class A limits for radio noise emissions set out in the Radio Interference Regulations of the Canadian Department of Communications.

In Europe

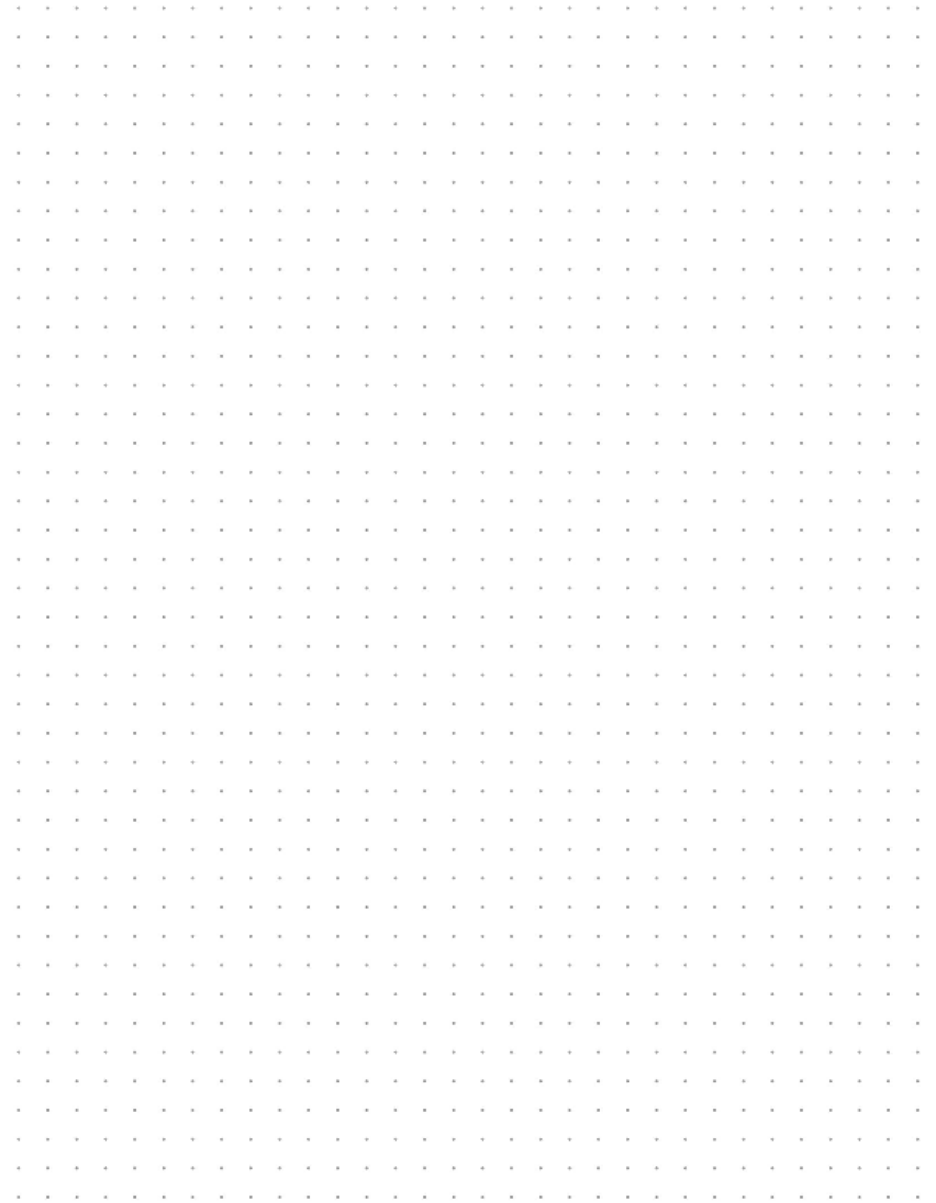
This device complies with the requirements of the EEC Council Directives 93/68/EEC (CE Marking), 73/23/EEC (safety – low voltage directive), and 89/336/EEC (electromagnetic compatibility). Conformity is declared to standards EN50081-1 and EN50082-1.

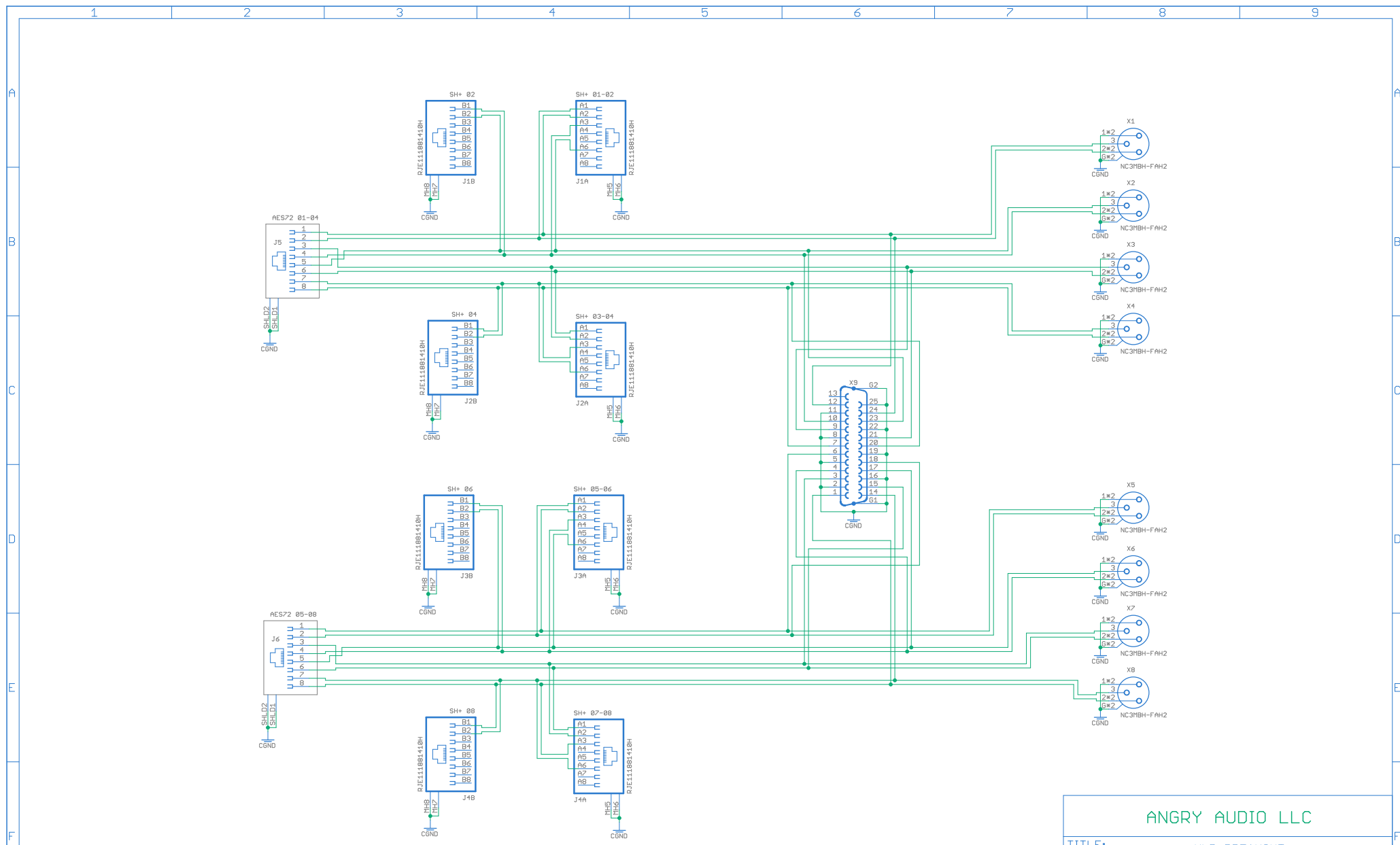
Engineering can be stressful.

For those who prefer cats over dogs, here is a basket of kittens. Meow.



Draw a schematic. You know you want to.





ANGRY AUDIO LLC		
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