

SLink Connections

SLink Port Protocols

SLink is not a protocol itself; it is an intelligent port which automatically switches mode depending on what it is connected to and can run in one of 3 different protocol 'modes'.

Protocol	Sample Rate	Maximum Number of Input Channels	Maximum Number of Output Channels
dSnake (+ME)	48kHz	40	20 (+40 ME)
DX	96kHz	32	32
gigaACE/GX	96kHz	128	128

The **dSnake**, **ME** and **DX** protocols are Fast Ethernet point-to-point connections (100BASE-TX, IEEE 802.3u) and Layer 2 compliant.

gigaACE is a Gigabit Ethernet point-to-point connection (1000BASE-T, IEEE 802.3ab), Layer 2 compliant.

① Sample Rate Conversion is carried out on the incoming and/or outgoing signal when dSnake or ME is in use, meaning the mixer always runs at 96kHz internally for all processing and mixing.

Cables and Connections

STP CAT5 (or higher) cables are required for **dSnake**, **ME** or **DX** connections, though STP CAT5e is recommended.

STP CAT5e (or higher) cables are required for **gigaACE/GX** connections, and

recommended for all connections.

STP CAT6a (or higher) cables are recommended for **gigaACE/GX** connections to the Qu series.

ⓘ UTP cables are not supported.

The maximum length of each cable is 100m*. With 2 expanders cascaded, this allows a maximum distance of up to 200m between the SLink port and the second expander. Using a DX Hub allows for an additional 100m cable run between the SLink port and DX Hub giving a maximum distance of 300m between the SLink port and the second expander.

*Up to 80m when using gigaACE/GX protocol with Qu series.

ⓘ Use of passive couplers or low quality connectors can reduce the maximum length of cable that can be used.

Clocking / Sync

Synchronising to a clock does not change the sample rate of the device, it just aligns the samples correctly.

Expanders are automatically clocked to the mixer/system they are connected to.

When connecting systems, one system (mixer) should be the leader and any/all other systems should be clocked to this. In the case of a direct SLink port to SLink port connection, either system can be the leader. In the specific case of direct connection from an SQ to a Qu however, the Qu cannot clock to an external source so it must always be the clock leader.

If a system is not clocked correctly, you will experience audible artefacts such as 'clicks' and 'pops' due to the misalignment of samples.

Preamp control

The only control information sent and received through the SLink port is for the control of preamps in a connected expander.

48V Phantom Power, PAD and Gain settings are adjusted from either the processing preamp section of an input channel, or by using socket controls from the I/O screen where available. Control messages are sent out to the expander, and the GUI is then updated to show the current state.

Sample Rate Conversion (SRC)

Each SLink port has built-in sample rate conversion, so when using 48kHz expanders or connections, incoming audio is up-sampled to 96kHz before being sent to the mixing core and down-sampled before being sent back out.

As SRC is independent per port, having multiple SLink ports on one system (through the addition of an SLink option card) enable different protocols to be used on each.

For example, one SLink port could be connected to a gigaACE option card in a dLive system (gigaACE) and the other could be connected to an AB168 (dSnake).

Automatic Firmware Updating

Once an expander is connected, the firmware is automatically checked and matched to the mixer it is connected to.

The expander firmware required is different for each range of mixer, and can also change with updates to mixer firmware, so it is stored in the mixer and sent to an expander when needed.

When connecting the same expander to the same system (without changes to mixer firmware) connection will be very quick as the installed firmware will already be correct.

If a firmware update is required, it could take a few minutes to complete. If the expander is connected at the end of a system (i.e. through another unit, or a DX hub) checking and updating may take slightly longer.

If your expander is having difficulty in connecting correctly at the end of a cascade, try connecting just that one expander directly first in order to ensure it is running the correct firmware.

LED's

When the initial connection is made, the 'Lnk' LED's on the SLink port and expander will flash yellow rapidly.

If making a system to system connection (SLink to another SLink port or gigaACE option card) the 'Lnk' LED will then continue to flash yellow steadily on both ports at the same speed.

If connecting to an expander with mismatched firmware (or on first connection), the 'Lnk/Err' LED's on the expander will flash red and then yellow rapidly whilst the firmware is being updated. Once the update is complete the expander will automatically reboot.

When an expander is running the correct firmware, the 'Lnk' LED's will then continue to flash yellow steadily, with the expander LED flashing twice as fast as the SLink port LED when connected to dSnake devices or at the same rate when connected to expanders using other protocols. The 'Ready' LED on the expander will also illuminate to show there is an active system connection.

Muting

Expanders are muted until connected to a system. When the 'Ready' LED illuminates, the expander will be unmuted.

The SLink Option Card

An SLink Option card is available for use with the SQ and AHM ranges and provides an additional SLink port.

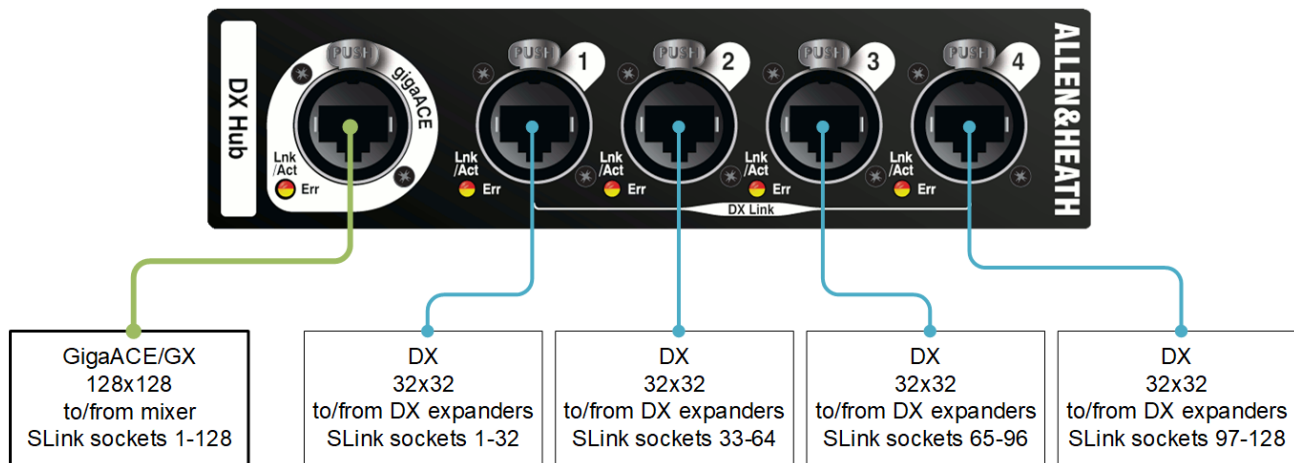


It has exactly the same functionality as a built-in port, but operates independently, with separate Sample Rate Conversion where required, allowing two different protocols to be run on the same system.

With an SLink card fitted, all possible SLink connections listed in the examples below can be run on either port, and any combination of two can be used simultaneously.

DX Hub

The DX Hub features 1x gigaACE port for connection to the mixer, along with 4x DX ports for connection to DX expanders.



The mixer shows 128 inputs and 128 outputs, mapped as follows:

DX Port 1 (32×32)	=	gigaACE/GX inputs and outputs 1-32
DX Port 2 (32×32)	=	gigaACE/GX inputs and outputs 33-64
DX Port 3 (32×32)	=	gigaACE/GX inputs and outputs 65-96
DX Port 4 (32×32)	=	gigaACE/GX inputs and outputs 97-128

Switches, Fibre, Convertors and VLANs

The Allen & Heath protocols supported by the SLink port are designed for point-to-point connection.

For information on use of switches, fibre, convertors and VLANs with the gigaACE, GX and DX protocols, please refer to the following article:

<https://support.allen-heath.com/hc/en-gb/articles/45526905505425-gigaACE-and-DX-networking-VLANs-and-Fibre-Optics>

dSnake Expander Examples

AR84

AR84



+8
Mic/Line Inputs
+4
Line Outputs

Protocol
dSnake
Sample Rate
48kHz

AB168 + ME

AB168



+16
Mic/Line Inputs
+8
Line Outputs
(+40 for ME)

Protocol
dSnake+ME
Sample Rate
48kHz

AR2412 + ME

AR2412



+24
Mic/Line Inputs
+12
Line Outputs
(+40 for ME)

Protocol
dSnake+ME
Sample Rate
48kHz

AB168 + AR84

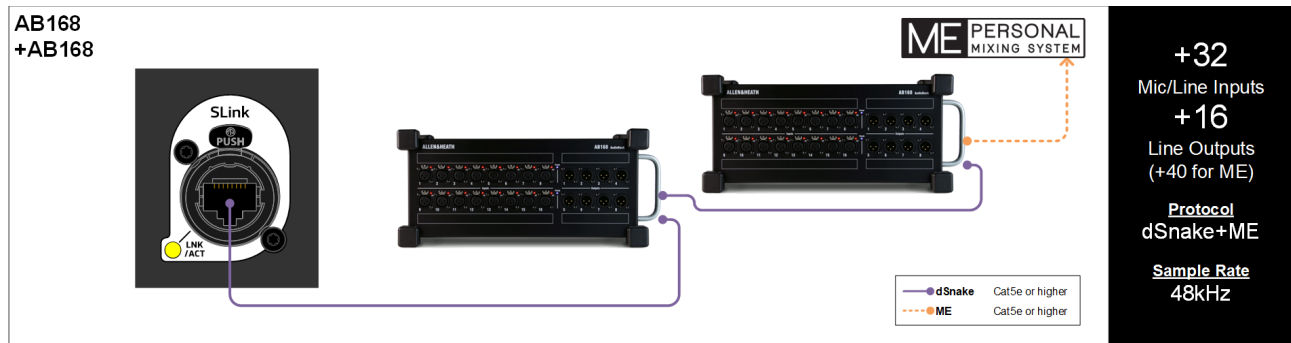
AB168 +AR84



+24
Mic/Line Inputs
+12
Line Outputs

Protocol
dSnake+ME
Sample Rate
48kHz

AB168 + AB168 + ME



AR2412 + AR84 + ME



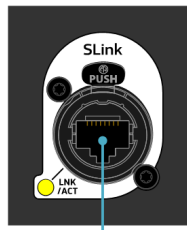
AR2412 + AB168 + ME



DX Expander Examples

DX88-P

DX88-P



DX Cat5e or higher

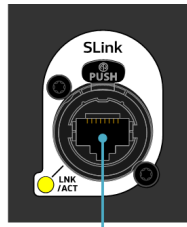
+8
Mic/Line Inputs
+8
Line Outputs

Protocol
DX

Sample Rate
96kHz

DX168

DX168



DX Cat5e or higher

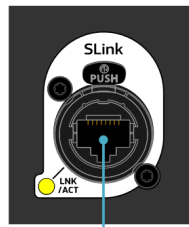
+16
Mic/Line Inputs
+8
Line Outputs

Protocol
DX

Sample Rate
96kHz

DX164-W

DX164-W



DX Cat5e or higher

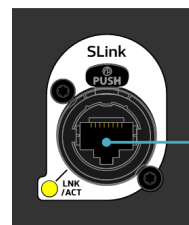
+16
Mic/Line Inputs
+4
Line Outputs

Protocol
DX

Sample Rate
96kHz

DX012

DX012



- ① Sockets 4-8 are either line (4-8) or stereo AES (1-8) outputs.
- ① Sockets 9-12 are either line (9-12) or stereo AES (9-16) outputs.

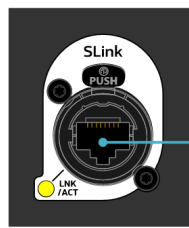
DX Cat5e or higher

+≤12
Line Outputs
+≤8
AES St Outputs

Protocol
DX

Sample Rate
96kHz

DX32

DX32

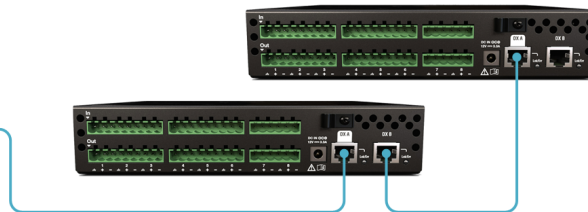
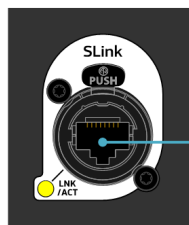
- ① The number of inputs/outputs depends on the 4 modules installed
 ② Each slot uses 8 input or 8 output channels

— DX Cat5e or higher

+≤32
Mic/Line/AES Inputs
+≤32
Line/AES Outputs

Protocol
DX

Sample Rate
96kHz

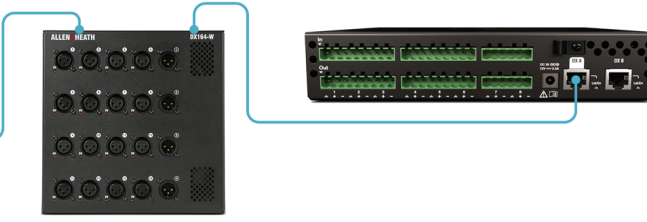
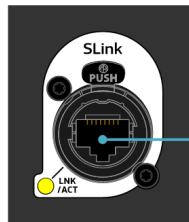
DX88-P + DX88-P**2xDX88-P**

— DX Cat5e or higher

+16
Mic/Line Inputs
+16
Line Outputs

Protocol
DX

Sample Rate
96kHz

DX164-W + DX88-P**DX164-W
+DX88-P**

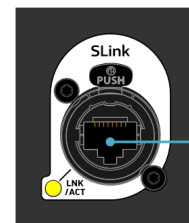
- ① Use cascade mode for the DX164-W

— DX Cat5e or higher

+24
Mic/Line Inputs
+12
Line Outputs

Protocol
DX

Sample Rate
96kHz

DX168 + DX168**DX168
+DX168**

- ① Use cascade mode for the first DX168 in the chain

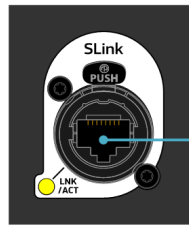
— DX Cat5e or higher

+32
Mic/Line Inputs
+16
Line Outputs

Protocol
DX

Sample Rate
96kHz

DX168 + DX164-W

**DX168
+DX164-W**

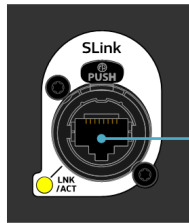
- ① The DX168 and DX164W can be connected in any order
 ② Use cascade mode for the first unit in the chain

— DX Cat5e or higher

+32
Mic/Line Inputs
+12
Line Outputs

Protocol
DX

Sample Rate
96kHz

DX168 + DX012**DX168
+DX012**

- ① The DX168 and DX012 can be connected in any order
 ② Use cascade mode for the first unit in the chain

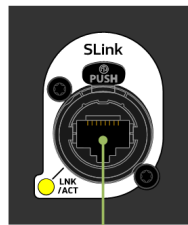
— DX Cat5e or higher

+16
Mic/Line Inputs
+≤20
Line Outputs
+≤8
AES St Outputs

Protocol
DX

Sample Rate
96kHz

DX Hub Examples

DX Hub + 3xDX168**DX Hub
+3xDX168**

- ① Up to 2 DX units featuring cascade mode can be connected in any order to each DX port

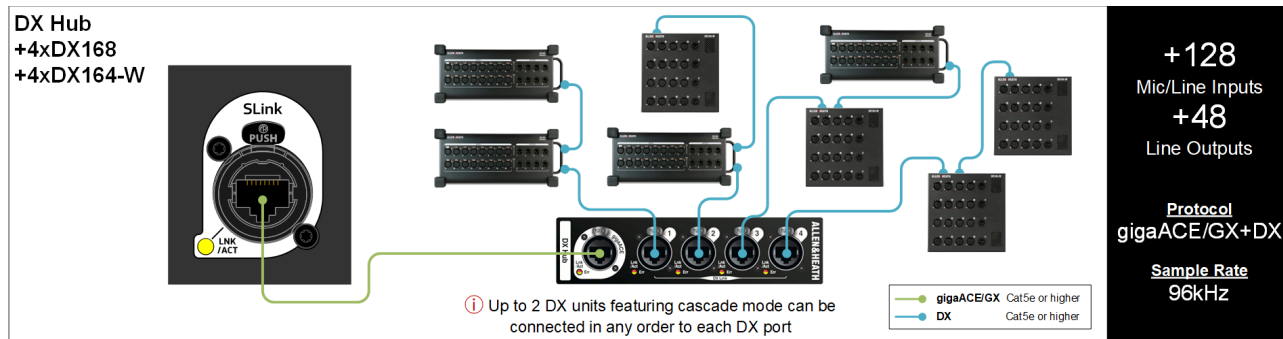
— gigaACE/GX Cat5e or higher
 — DX Cat5e or higher

+48
Mic/Line Inputs
+24
Line Outputs

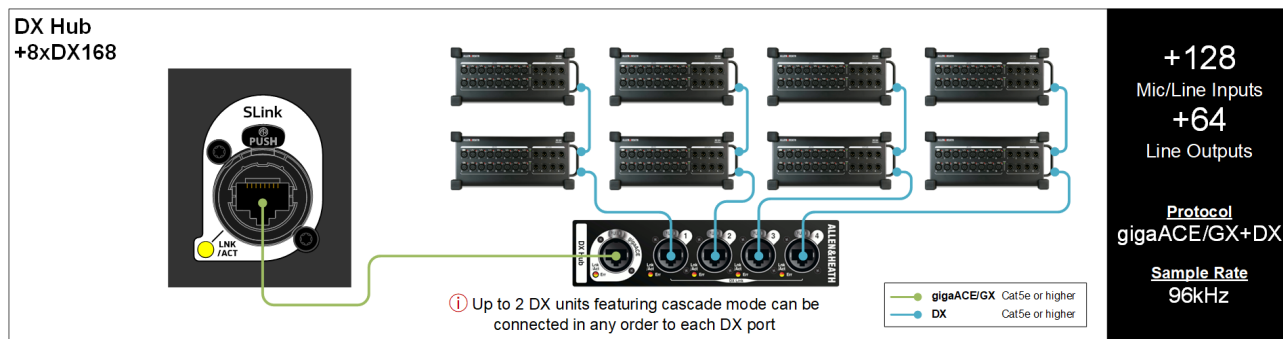
Protocol
gigaACE/GX+DX

Sample Rate
96kHz

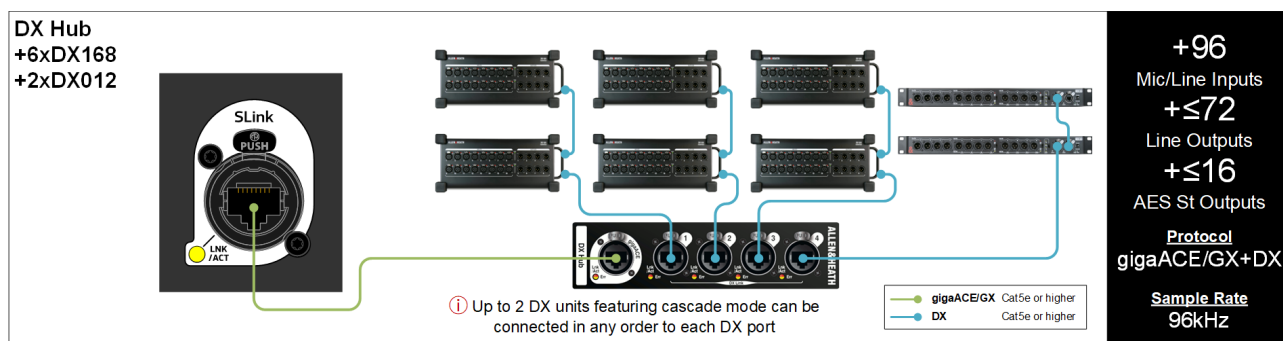
DX Hub + 4xDX168 + 4xDX164-W



DX Hub + 8xDX168



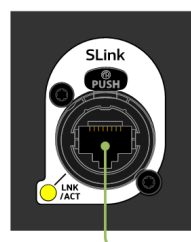
DX Hub + 6xDX168 + 2xDX012



GX Expander Examples

① Cat6a cable up to 80m should be used for gigaACE/GX connections to a Qu mixer.

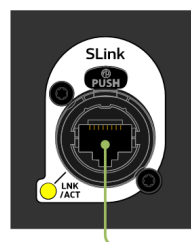
GX4816 + ME

GX4816
ME PERSONAL
MIXING SYSTEM

① The DX2 port can be connected to either DX expanders or a ME system, but not both

— gigaACE/GX Cat5e or higher
— ME Cat5e or higher

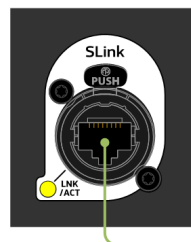
+48
Mic/Line Inputs
+24
Line Outputs
(+40 for ME)
Protocol
gigaACE/
GX+DX+ME
Sample Rate
96kHz

GX4816 + 2xDX168 + ME**GX4816**
+2xDX168
ME PERSONAL
MIXING SYSTEM

① The DX2 port can be connected to either DX expanders or a ME system, but not both

— gigaACE/GX Cat5e or higher
— DX Cat5e or higher
— ME Cat5e or higher

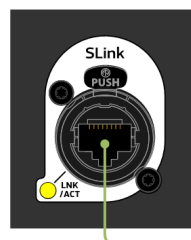
+80
Mic/Line Inputs
+32
Line Outputs
(+40 for ME)
Protocol
gigaACE/
GX+DX+ME
Sample Rate
96kHz

GX4816 + 4xDX168**GX4816**
+4xDX168

① Up to 2 DX units featuring cascade mode can be connected in any order to each DX port

— gigaACE/GX Cat5e or higher
— DX Cat5e or higher

+112
Mic/Line Inputs
+48
Line Outputs
Protocol
gigaACE/GX+DX
Sample Rate
96kHz

GX4816 + 2xDX168 + 2xDX012**GX4816**
+2xDX168
+2xDX012

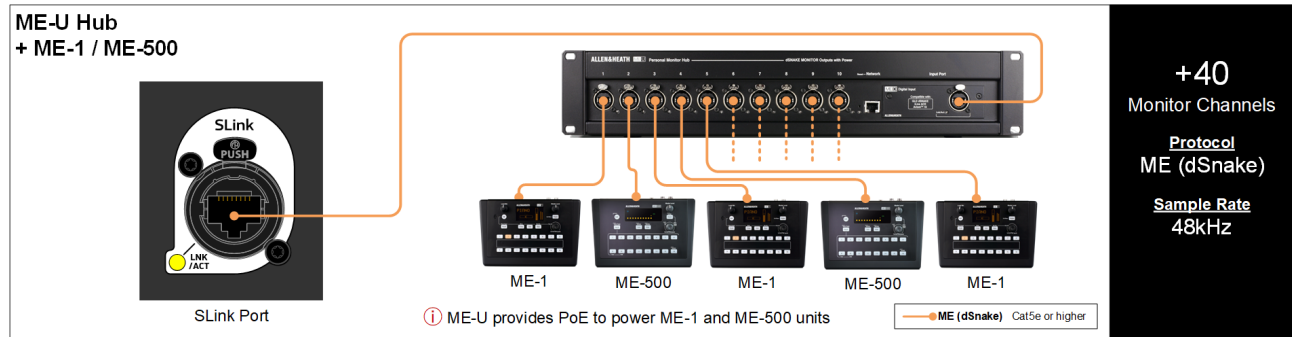
① Up to 2 DX units featuring cascade mode can be connected in any order to each DX port

— gigaACE/GX Cat5e or higher
— DX Cat5e or higher

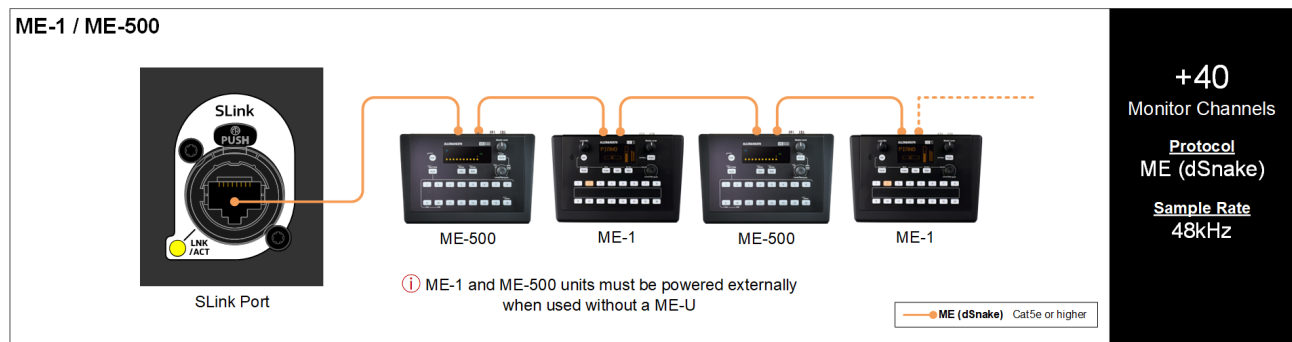
+80
Mic/Line Inputs
+≤56
Line Outputs
+≤16
AES St Outputs
Protocol
gigaACE/GX+DX
Sample Rate
96kHz

ME Personal Monitoring Examples

MEU + ME1 + ME500



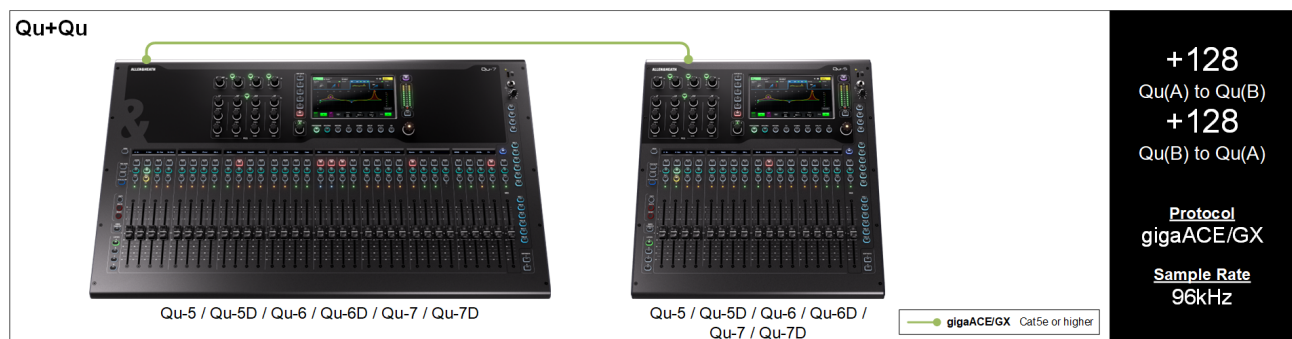
ME1 + ME500



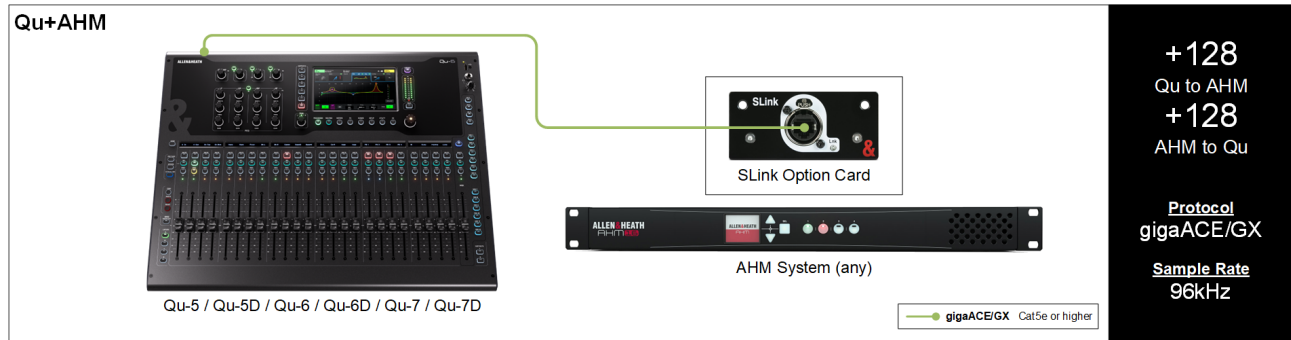
System to System Examples

① Cat6a cable up to 80m should be used for gigaACE/GX connections to a Qu mixer.

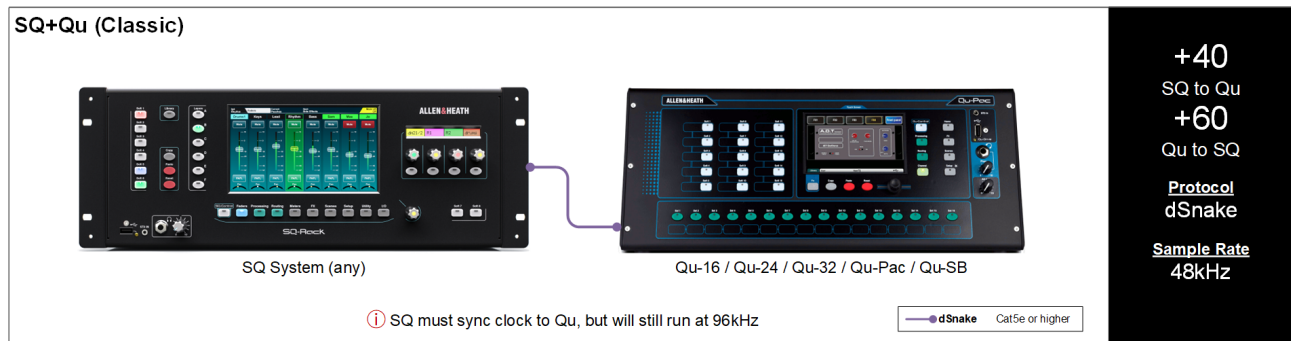
Qu + Qu



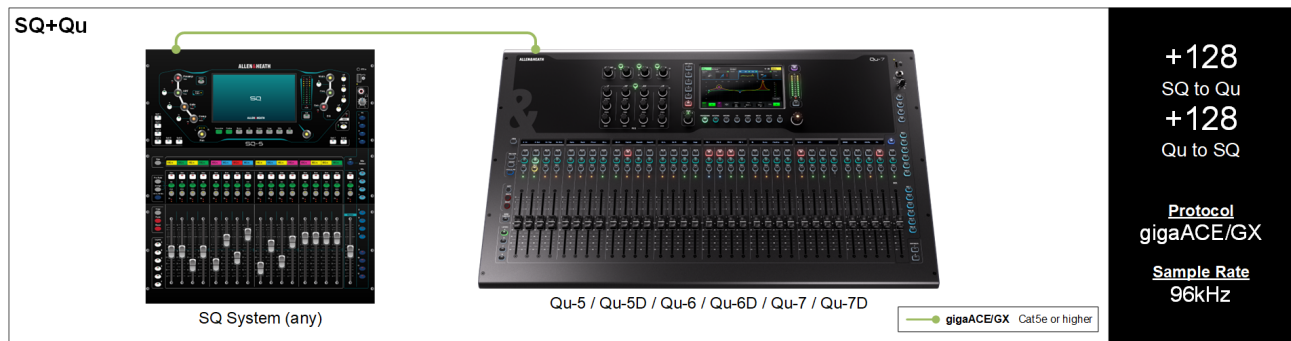
Qu + AHM



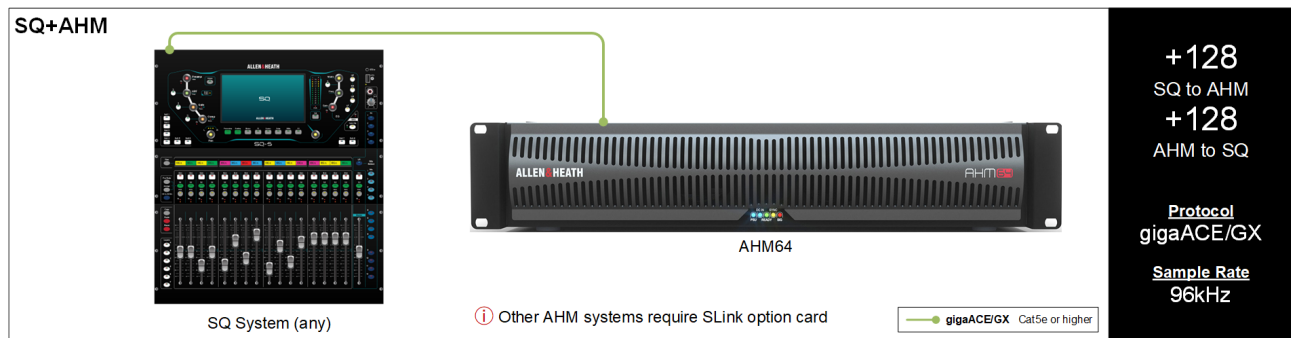
SQ + Qu (Classic)



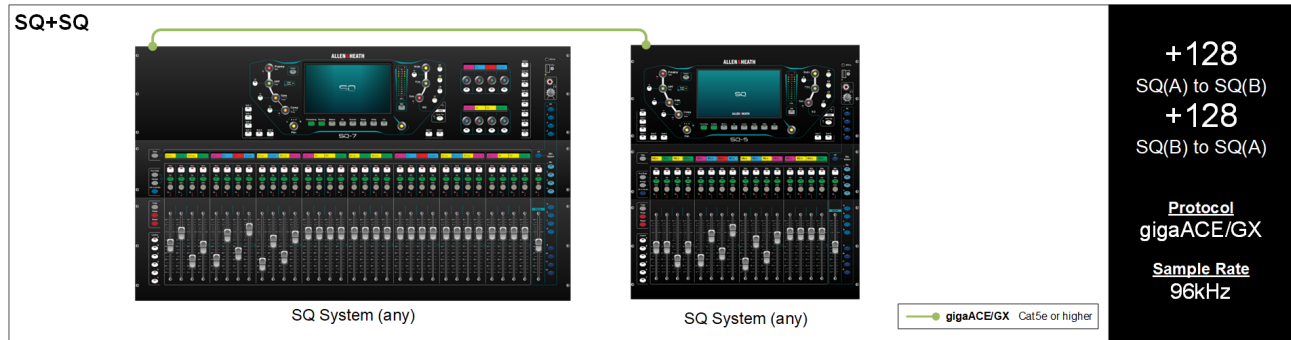
SQ + Qu



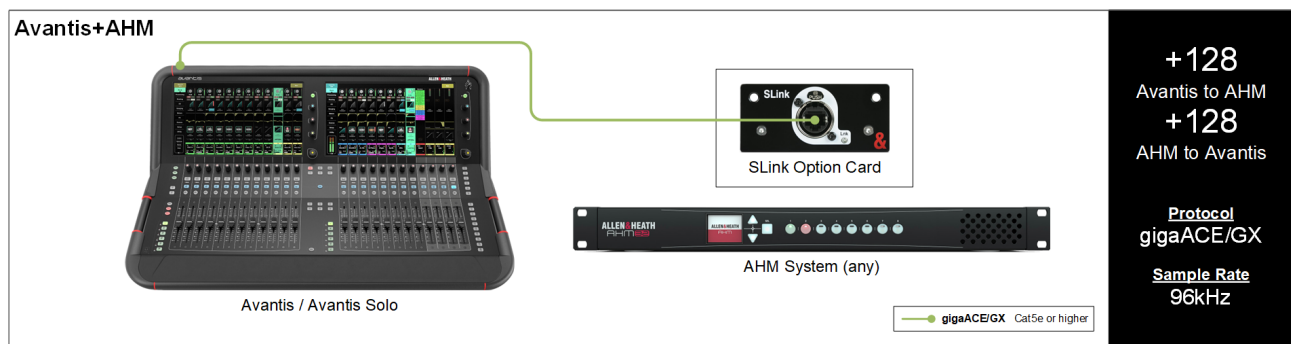
SQ + AHM



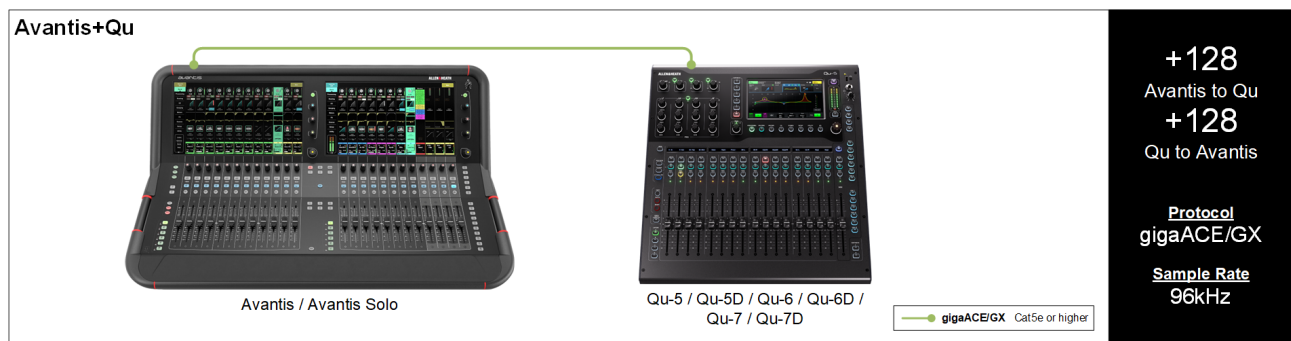
SQ + SQ



Avantis + AHM



Avantis + Qu

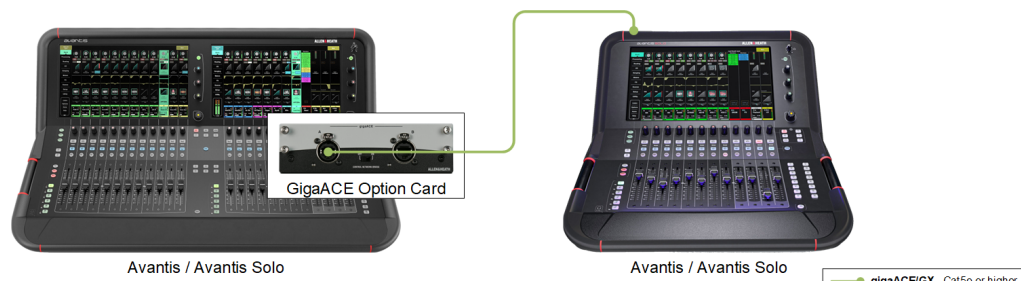


Avantis + SQ



Avantis + Avantis

Avantis+Avantis



+128
Avantis(A) to
Avantis(B)
+128
Avantis(B) to
Avantis(A)

Protocol
gigaACE/GX

Sample Rate
96kHz

dLive + AHM

dLive+AHM



+128
dLive to AHM
+128
AHM to dLive

Protocol
gigaACE/GX

Sample Rate
96kHz

dLive + Qu

dLive+Qu



+128
dLive to Qu
+128
Qu to dLive

Protocol
gigaACE/GX

Sample Rate
96kHz

dLive + SQ

dLive+SQ



+128
dLive to SQ
+128
SQ to dLive

Protocol
gigaACE/GX

Sample Rate
96kHz

dLive + Avantis



FAQ's

Can expanders increase the number of mixer channels?

The number of processing channels is determined by the mixer core. Adding I/O sockets by connecting expanders via SLink provides access to more input and output sockets but does not increase the number of processing channels available.

Can I connect a DX168 to an AR2412?

No, multiple protocols cannot be used at the same time on a single port.

How many expanders can be cascaded?

dSnake and DX protocols support a maximum of two remote audio units per port.

The GX4816 and DX Hub have multiple DX ports, allowing a maximum of two DX expanders to be used on each.

Can I cascade two AR2412's?

It is not possible to connect two AR2412's to a single port (the maximum number of dSnake inputs is 40).

How do I cascade DX expanders?

Where possible (e.g. DX168, DX164-W, DX012, DX88-P), the first DX in the cascade should be set to 'Cascade' mode with the second unit connected to port B.

The second DX unit in cascade mode uses inputs and outputs numbered 17-32. For example, with two DX168s cascaded, outputs 9-16 are unavailable and the outputs for the second unit are 17-24.

How do I connect ME personal monitors?

The ME personal monitoring system can either be connected directly to the SLink port, to an 'Expander' or 'Monitor' port on AR2412/AB168 or to the DX2/ME port on GX4816 (with no DX expanders connected).

How do I update the firmware of the expander?

Expander firmware is automatically checked and matched to the mixer upon connection.

How long can the network cable be?

The maximum distance between each connection is 100m. This means the distance from the SLink port to the first unit could be 100m, and the distance from that unit to a second could also be 100m.

When using the gigaACE/GX protocol with a Qu mixer, including to a DX Hub, a GX expander or an SLink to SLink (system to system) connection, the maximum cable length is 80m with Cat6a (or higher) cable.

What network cable should I use?

Cat5e (or higher) STP cable should be used throughout any system. Cat6a (or higher) STP cable should be used for gigaACE/GX connections to a Qu mixer.