D i g i g r a m

ES220
ES220-L

Ethernet Audio Bridges

User's manual

Digigram

Important Safety Information
read carefully before using this equipment!

Follow these instructions and keep them in a safe place! Keep in mind that damages due to failure to observe the instructions contained in this manual are not covered by warranty.

Instructions importantes de sécurité
lire soigneusement avant d'utiliser l'équipement!

Lisez et suivez ces instructions. Conservez les pour consultation ultérieure! Les dommages dus au non-respect des instructions contenues en ce manuel ne sont pas couvert par la garantie.

Wichtige Sicherheitshinweise
vor Inbetriebnahme des Gerätes sorgfältig lesen!

Befolgen Sie die Anweisungen und bewahren Sie sie für spätere Fragen auf! Bei Schäden, die durch Nichtbeachten dieser Bedienungsanleitung verursacht werden, erlischt der Garantieanspruch!

Throughout this manual, the lightning bolt triangle is used to alert the user to the risk of electric shock.

The exclamation point triangle is used to alert the user to important operating or maintenance instructions.

Do Not Open the Cabinet

There are no user-serviceable components inside this product. Opening the cabinet may present a shock hazard, and any modification to the product will void your warranty. If it is necessary to open the device for maintenance or advanced configuration purposes, this is to be done by qualified personnel only after disconnecting the power cord and network cables!

Power supply

The device is to be connected only to a power supply as specified in this manual and marked on the equipment. This equipment must be earthed!

Do not block any of the ventilation openings!

Humidity

To reduce the risk of fire or shock, do not expose this device to rain or moisture. Do not place objects filled with liquid on this device.

Installation Location

To ensure proper operation and to avoid safety hazards, the device must be installed in a 19“ rack mount chassis. If this is not possible, place it on a firm and level surface. Avoid installation in

Ne pas ouvrir l'appareil

L'ouverture du coffret peut produire un risque de choc électrique, et toute modification du produit annule votre garantie. S'il est nécessaire d'ouvrir l'appareil pour l'entretien ou la configuration avancée, cela doit être fait par du personnel qualifié, après avoir débranché le cordon d'alimentation et les câbles réseaux !

Alimentation

Il est primordial de connecter l'appareil à une alimentation électrique telle que spécifiée dans ce manuel d´utilisateur et sur le matériel même.

Cet équipement doit être raccordé à la terre !

N'obstruer aucune ouverture de ventilation !

Humidité

Afin de réduire les risques de feu ou de choc, n'exposez pas cet appareil à la pluie ou l'humidité. Ne placez pas d´objet contenant un liquide sur l'appareil.

Installation, mise en place

Afin d'assurer le fonctionnement correct et de minimiser les risques potentiels liés à la sécurité, l'appareil doit être installé dans une baie de montage de type 19 pouces. Si cela ne vous est pas

Gerät nicht öffnen

Öffnen des Geräts kann eine Gefährdung durch Stromschlag und Erlöschen der Garantie zur Folge haben. Reparaturarbeiten und Änderungen der Hardwarekonfiguration dürfen nur von qualifiziertem Personal nach entfernen der Strom- und Netzwerkkabel durchgeführt werden.

Stromversorgung

Das Gerät darf nur mit der in dieser Bedienungsanleitung und auf dem Gerät angegebenen Stromversorgung betrieben werden. Erdung ist zu gewährleisten!

Belüftungsschlitze nicht verdecken!

Wasser und Feuchtigkeit

Um Brand- oder Stromschlagrisiken zu vermeiden, darf das Gerät nicht mit Feuchtigkeit in Berührung kommen.

Aufbau des Geräts

Um den einwandfreien Betrieb zu gewährleisten und Sicherheitsrisiken zu vermeiden, muss das Gerät in einem 19-Zoll Baugruppenrahmen montiert werden. Nur wenn dies nicht möglich ist, stellen Sie das Gerät auf einen festen, waagerechten

extremely hot or cold locations, or in an area that is exposed to direct sunlight or heating equipment. Avoid moist or humid locations.

Cleaning

Clean only with a soft, dry cloth. If necessary, after disconnecting the unit's cables, wipe it with a soft cloth dampened with mild soapy water, then with a fresh cloth with clean water. Wipe dry immediately with a dry cloth. NEVER use benzene, aerosol cleaners, thinner, alcohol or any other volatile cleaning agent. Do not use abrasive cleaners, which may damage the finish of metal or other parts.

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, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Moving the device

Before moving the unit, be certain to disconnect any cables that connect with other components.

possible, placez le sur une surface solide et plane.

Evitez une installation dans des endroits très chauds ou très froids ainsi que dans des lieux exposés directement au soleil. Evitez les lieux présentant un excès d'humidité.

Nettoyage

Nettoyez uniquement avec un chiffon doux et sec. Si nécessaire, après avoir débranché le cordon d´alimentation, essuyez-le avec un chiffon doux humidifié avec de l´eau savonneuse puis rincez le á l´aide d un chiffon propre et d´eau claire.

Séchez-le immédiatement avec un chiffon sec. N'utilisez JAMAIS d´essence, de nettoyants en aérosols, d´alcool ou tout autre agent nettoyant volatile. N'utilisez pas de produits nettoyants abrasifs qui pourraient endommager les finitions métalliques ou d´autres pièces.

Réparation

Lorsque l'appareil a été endommagé quelle qu'en soit la cause ou qu'il ne fonctionne pas normalement, toute réparation doit être effectuée par du personnel qualifié. Avant de transporter l´unité, assurez-vous d´avoir bien déconnecté le cordon d'alimentation ainsi que tous les câbles la reliant à d´autres appareils.

Untergrund. Meiden Sie Standorten in den Nähe von Wärme- oder Feuchtigkeitsquellen sowie direkte Sonneneinstrahlung.

Reinigen des Geräts

Säubern Sie das Gerät nur mit einem weichen, trockenen Tuch. Bei Bedarf verwenden Sie ein mit mildem Seifenwasser befeuchtetes Tuch, nachdem Sie die Netzanschlusskabel aus der Steckdose gezogen haben, anschliessend ein weiches, mit klarem Wasser befeuchtetes Tuch. Trocken Sie das Gerät sofort im Anschluss. Keinesfalls Benzol, Verdünner oder sonstige starke Lösungsmittel oder Scheuerreiniger verwenden, da hierdurch das Gehäuse beschädigt werden könnte.

Lassen Sie etwaige Reparaturen nur von qualifizierten Fachleuten durchführen!

Sollten das Netzkabel oder der Netzstecker beschädigt sein, oder sollte das Gerät selbst beschädigt worden sein (z. B. durch Eindringen von Feuchtigkeit durch Fall auf den Boden), oder sollte es nicht ordnungsgemäss funktionieren oder eine deutliche Funktionsabweichung aufweisen, so ist es von qualifizierten Fachleuten zu reparieren.

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WO 03/023759, FR 2 829 655, USA 2003/0050989

Table of Contents

Thank you for purchasing Digigram EtherSound ES220(-L)!

EtherSound ES220 and ES220-L are Digigram products incorporating the EtherSound technology. They allow to easily and economically insert into an EtherSound network or extract two digital audio channels (2 + 2 in the case of ES220) from it, using standard Ethernet components (CAT5 cables and switches).

ES220 converts two analog audio signals into two EtherSound channels and two EtherSound channels into analog audio signals, while ES220-L is configurable via jumpers: it either converts two analog audio channels into digital audio and inserts them into an EtherSound network, or it extracts two digital channels from the network to convert them into analog audio signals. Both feature GPIOs and take advantage of EtherSound's simple, nearly instant set-up.

EtherSound ES220 and ES220-L allow audio distribution with a flexibility going well beyond the possibilities of analog audio installations. Routing can be adapted remotely to the changing needs of the audio installation.

For more information on the EtherSound technology we invite you to visit our web site where several documents (in English) are available for download.

INFORMATION FOR THE USER

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 and with the following European and international Standards for:

Electrical safety:	Elecromagnetic compatibility:
Europe: EN60950, 3rd edition *European Directive 73/23/CEE "Low Voltage Directive"* *International: EN60950, 3rd edition*	*Europe : EN55022:1998 + A1:2000, Class B / EN55024: 1998 + A1:2001* *European Directive 89/336/CEE on electromagnetic compatibility* *International: CISPR22:1997 + A1:2000 CLASS B* *United States: FCC Rules-Part 15-Class B*

In order to guarantee compliance with the above standards in an installation, the following must be done:

- the provided cables must not be modified.
- additional cables used must have their respective shield connected to each extremity.

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

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 the receiver
* connect the equipment into an outlet on a circuit different from that of the receiver
* consult the dealer or an experienced audio television technician.

Note: *Connecting this device to peripheral devices that do not comply with CLASS B requirements or using an unshielded peripheral data cable could also result in harmful interference to radio or television reception. The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. To ensure that the use of this product does not contribute to interference, it is necessary to use shielded I/O cables.*

CONTENTS OF THIS PACKAGE

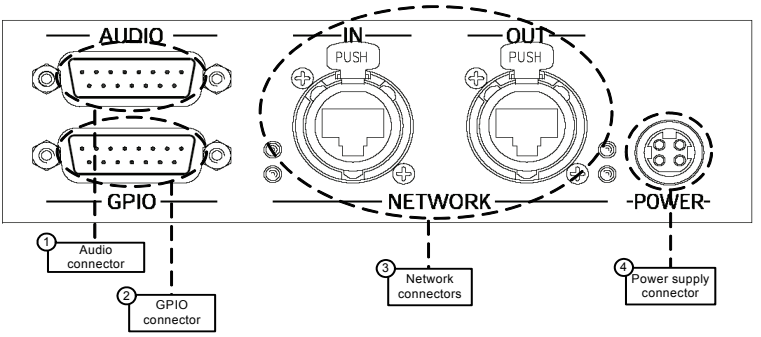
The ES2 package consists of the following components:

* one ES220 or one ES220-L 1/3 U rack device
* counterpart plug for the power connector
* the user's manual at hand.
* a power supply (*optional*)
* an analog cable 2 inputs / 2 outputs (*optional with ES220*)
* an analog cable 2 outputs (*optional with ES220-L*)
* an analog cable 2 inputs (*optional with ES220-L*)

Also available for ES220 & ES220-L:

* 1U 19 inch rack to mount up to three ES220 or ES220-L (*optional, including two blind panels and fastenings*)
* Mounting bracket for under-table fixing (*optional, including fastenings*)

ES220 & ES220-L rear panels



1. Audio connectors

On ES220, a Sub-D 15 connector is used to input two balanced analog signals and to output two balanced analog signals.
On ES220-L, only one of these two functions is accessible depending on the configuration selected (for connector pinout see appendix C).

2. Network connectors

These two EtherCon™ Neutrik™ RJ45 connectors allow for a steady and reliable connection to the EtherSound network. The "IN" port allows connecting the ES220 to the equipment upstream, while the "OUT" port allows connecting the ES220 to the equipment downstream. When an ES220 receives a descending stream on its "IN" port, it transmits it to its "OUT" port, after - if required - having injected two EtherSound channels (if this device is not the last element of the EtherSound chain). When an ES220 receives an ascending stream on its "OUT" port, it transmits it to its "IN" port, after - if required - having injected two EtherSound channels (if this device is not the Primary Master). For more details, see the document "EtherSound Overview" (available on our Web site).

3. GPIO connector

This connector allows setup of external control and monitoring devices through configurable and protected General Purpose Inputs and Outputs. See appendix D dedicated to the GPIOs for more details.

Note: *the GPIO port is managed by configuration software only.*

4. Power supply connector

4-pin Mini DIN connector (for the connector pinout see it appendix G).

INSTALLATION

Before mounting devices in a rack…

Internal settings

Note: These operations require opening of the cabinet and shall be done by qualified personnel only.

Setting the EtherSound channels (ES220 and ES220-L)

Four decimal rotary switches on the EtherSound board inside the device determine whether the assignment of the EtherSound channels to the inputs or outputs of ES220(-L) is done locally or remotely by configuration software. (*to modify this setting, see appendix B*).
By default, the devices are parameterized for software control (factory setting).

Input/Output configuration (ES220-L only)

On ES220-L, a jumper makes it possible to parameterize whether the equipment adds two channels to the network EtherSound (*Master*) or restores two channels (*Slave*); for more details, please refer to appendix E of this manual).
By default, the devices are parameterized in order to restore two channels from the network (Slave).

Nominal input level

The nominal input level can be configured via internal jumpers. The default value is + 4 dBu, it can be set to -10 dBu (*for more details, please refer to appendix E of this manual*).

Connecting your EtherSound device

It is recommended to establish all connections before powering up the device.

Power supply

Before plugging the power cord, make sure that:

- the power cord is not damaged
- the AC outlet used is properly earthed.

Note: Just like for any other audio system, power the individual devices up following the audio path and power down in the opposite direction.

Do not allow anything to rest on the power cable. Keep the power cable away from where people could trip over it.

Network

The network connections are established via two Neutrik™ EtherCon™ RJ45 receptacles. Connection is very easy: use the connector labeled "IN" connect the equipment with the next upstream device, the connector labeled "OUT" to connect the equipment with the neighbored downstream device of the EtherSound network.

The Neutrik™ EtherCon™ RJ45 provide secure connection through a latching system. To disconnect the cable from the device, press the latch, then withdraw the cable while maintaining the latch pushed.

If you use an ES220(-L) as Primary Master, the "IN" port may be connected to a control computer for system configuration (if this connection is **not** established through a switch, a **crossover cable** is required!).

Example 1: point-to-point transmission of two audio channels

This application is very easy with EtherSound ES220 and ES220-L.

Connect a standard Ethernet cable between the "OUT" port of an ES220 or an ES220-L configured as *Master* and the "IN" port of an ES220 or an ES220-L configured as *Slave*. Select the EtherSound channels on both devices in accordance with each other (see chapter *"Setting the EtherSound channels"*).

Example 2: adding more devices

You can easily insert further ES220(-L) devices to build a simple daisy chain. There are only two rules to follow:

The first device in the chain is necessarily the Primary Master.

Install the devices in the chain starting from the Primary Master; connect its "OUT" port to the "IN" port of the next device, connect its "OUT" port to the "IN" port of the following device, and so on.

Example 3: more complex architectures

System topology may be daisy chain, star, or a combination of both. The first device in a network, such as an EtherSound ES220, provides the master clock for the entire network.

Connect its "OUT" port with the "IN" port of the following EtherSound device.

Repeat this step for each device in the network. The maximum distance between two devices connected via a horizontal CAT5 cable is approximately 90 meters (328 feet). Using patch cable, this distance is about 20 m (65 ft.). Intermediate switches or fiber optic links may be used to considerably increase this distance.

Connecting a computer to manage the EtherSound network

To connect a PC directly to an ES220(-L), it must be equipped with a network card. Use a **crossover Ethernet cable** to connect the network card to the "IN" port of the Primary Master.

You can also access the Primary Master through a conventional Ethernet network; in this case, use a standard Ethernet cable (e. g. connected to a switch)

Audio

The pinout of the connector is depicted on the label on top of the device:

These balanced inputs/outputs are can be used with unbalanced audio sources and destinations: just wire both cold pin and ground pin on ES220(-L) to the ground of the unbalanced signal and the hot pin to the signal. Note that in this case the unbalanced output signal is multiplied by two (+6 dB), it is thus necessary to reduce the output gain (-6 dB) in order not to saturate the signal.

By default, the nominal input/output level of an ES220 or an ES220-L is +4 dBu.

On ES220(-L) the nominal input level can be set to +10 dBu via internal jumpers (*for more details see appendix E: Setting the internal jumpers*).

The values of the nominal output level can be adjusted for each channel through management software and stored in the ES8out device.

GPIO

ES220 and ES220-L are shipped with four GPIs and four GPOs on a 15-pin Sub-D connector. For details see Appendix D.

Note: *the GPIO port is managed by configuration software only.*

Remote set-up by means of configuration software

To manage the device remotely using configuration software, the rotary switches must be set manually to any value ranging between 65 and 99 (factory setting). Use of the configuration software allows for advanced channel allocation; for software details, please refer to the online help file.

ES220 and ES220-L can be managed by Digigram's configuration software EScontrol. Please download the required software indicated hereafter from www.digigram.com, ***Downloads-Applications, EScontrol*** and install it in this order: the EtherSound driver (*EtherSound Runtime*), the specific DLLs to manage Digigram products (*ES Digigram Products Runtime*), and the *EScontrol* application.

Note: *This operation is only necessary if software control is needed.*

ES220 and ES220-L may also be managed through configuration software edited by Digigram development partners.

To uninstall the software go to **Add/Remove programs** in the Windows Control Panel.

Firmware update

Digigram may decide to publish firmware updates. It may then become necessary to upgrade your devices. In this case please refer to the respective documentation provided with the firmware upgrade tool.

SPECIFICATIONS

Configuration

Size	1/3 U 19“ rack : 42 x 146.5 x 210 mm
Power supply *(optional)* 	100 – 240 VAC, 47-63 Hz 5 V / 3 A *WARNING Do not open the power supply module. It contains hazardous voltages. There are no user-serviceable parts inside.*
Temp / humidity (non-condensing) Operating : Storage :	 0 °C – 50 °C / 0% - 95% -5 °C – 70 °C / 0% - 95%
Power consumption	2 A max.
Net weight	0.93 kg (~2.06 lbs)

Parameters

	Hardware	Software*
Audio channel selection	•	•
Inputs/outputs**	•	-
End of bi-directional loop	•	•
Audio extraction upstream/downstream	•	•
Audio insertion upstream/downstream	-	•
Nominal input level	•	-
Analog output gain	-	•

Note: for manual hardware configuration set the rotary switches to a value between 01 and 64, channels 65 through 99 set the device to remote software configuration

* *Windows 2000/XP compatible EtherSound configuration software such as Digigrams ‘EScontrol’*

** *ES220-L only*

Inputs/Outputs

	ES220	ES220-L
Analog audio	2 balanced analog mono line inputs* AND 2 servo-balanced analog mono line inputs**	2 balanced analog mono line inputs* OR 2 servo-balanced analog mono line inputs**
Impedance	22.2 kΩ	
Nominal input level	+4 dBu or -10 dBV (selectable by means of internal jumpers)	
Maximum input level	+22 dBu or +10 dBV (selectable by means of internal jumpers)	
Nominal output level	+4 dBu (software adjustable)	
Maximum output level	+22 dBu (software adjustable)	
Analog output gain	from -72 dBu to 0 dB (software adjustable)	

Connectivity

Analog audio	1 15-pin Sub-D
EtherSound	2 EtherCon female RJ45 compatible (connections "IN"/"OUT")
GPIO	4 inputs and 4 outputs on 15-pin Sub-D

* *can be used with unbalanced signals*

** *electronically servo-balanced outputs provide automatic level adjustment to accommodate either balanced or unbalanced lines*

Audio specifications

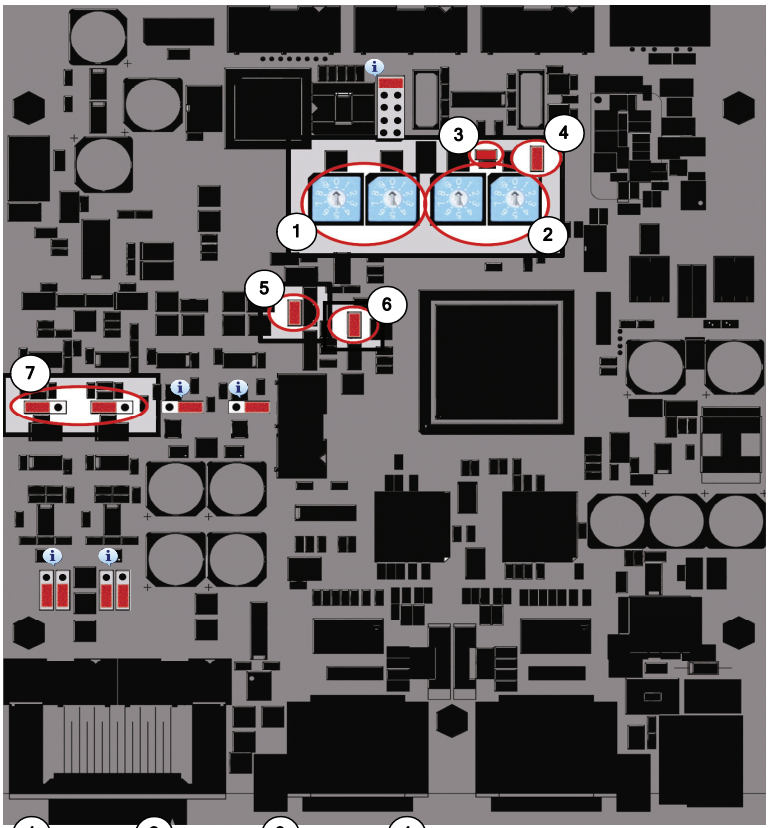
ES220 & ES220-L

Sampling frequencies available	48 kHz or 44.1 kHz (Primary Master: 48 kHz only)	
A/D and D/A converter resolution	24 bits	
Frequency response at 48 kHz	20 Hz -20 kHz: ±0.2 dB	
Dynamic range –60dBfs with Fs=48 kHz (20 Hz/20 kHz, unweighted)	> 102 dB	
Distortion + noise at 1 kHz (-1 dBfs with Fs=48 kHz)	<-95 dB (0.0018%)	
Phase difference between channels: 20 Hz/20 kHz	0.5° / 2°	
Analog channel crosstalk: at 1 kHz at 15 kHz (0 dBfs with Fs=48 kHz)	Inputs: <-116 dB <-92 dB	Outputs <-120dB <-105 dB

Synchronization

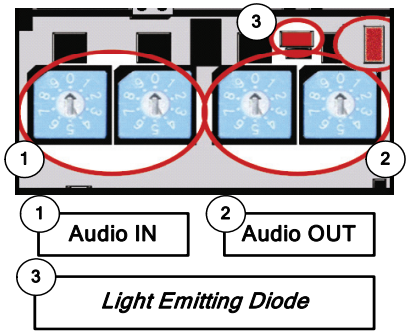
Clock source	Either internal (if first EtherSound device in a network) or external, locked on EtherSound upstream

APPENDIX A: BOARD LAYOUT



The jumpers marked ℹ show the default positions for the normal mode of operation; this adjustment MUST NOT be modified. These jumpers are reserved for maintenance purposes.

APPENDIX B: SETTING THE ETHERSOUND CHANNELS MANUALLY



(For the position of the rotary switches on the board see appendix A)

The two rotary switches on the left (Audio IN) allow encoding the channels to transport the audio coming from the analog inputs. The two rotary switches on the right (Audio OUT) allow encoding the channels to be played on the analog outputs. In every pair, the rotary switch on the left is the "tens" position and the rotary switch on the right is the "ones" position. Channels 01 to 64 are reserved for manual set-up, channels 65 to 99 set the device remote configuration.
Software configuration mode is indicated by a lightened red electroluminescent diode.
In position 00 of the rotary switches the audio is "*Mute*": in input mode no EtherSound channel inserted, in output mode no sound played.

To manually set the EtherSound channels to be used by the device, configure the number of the EtherSound channel to be assigned to the first analog input or output by means of a small screw-driver.

Example: to assign channel no. 24 the first EtherSound channel, set the left switch to "2", the right one to "4".

The other channel is assigned subsequently (In our example: 25).

The factory preset is 90, thus the control is done remotely by software.

Note: *On ES220-L, only one pair of rotary switches is active, depending on the selected configuration: inputs OR outputs.*

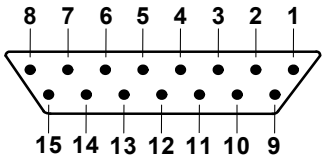
Light Emitting Diode (3)

This red LED indicates whether the EtherSound channel selection is done manually by hardware (LED off) or remotely by software (LED on).

APPENDIX C: AUDIO CONNECTOR

On ES220, a Sub-D 15 connector is used to input two balanced analog signals and to output two balanced analog signals.
On ES220-L, only one of these two functions is accessible depending on the configuration selected (*for connector pinout see appendix D*).

Pinout



15-pin Sub-D connector

Pin #	Signal	Pin #	Signal
1	OUT 2 – (R)	9	OUT 2 + (R)
2	Ground	10	OUT 1 – (L)
3	OUT 1 + (L)	11	Ground
4	Ground	12	Ground
5	Ground	13	IN 2 + (R)
6	IN 2 – (R)	14	Ground
7	IN 1 + (L)	15	IN 1 – (L)
8	Ground		

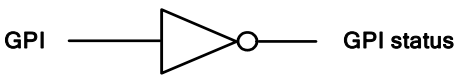
APPENDIX D: GPIO CONNECTOR

ES220 and ES220-L have four TTL 5 V compatible GPIs and four open collector GPOs. GPIs allow defining statuses read by the EtherSound configuration software, GPOs can be used by the EtherSound configuration software for remote control of external devices.

General Purpose Inputs (GPIs)

Schematic diagrams show the particular design for each GPI. The GPI status can be either 1 (=ON) or 0 (=OFF). It is read at "0" as soon as the system connected to GPI provides a tension higher than 2.5 V without ever exceeding 5 V. Otherwise, GPI is read at "1".

Note: *Pin 1 delivering +5 V electric potential and pin 6 being connected to ground (0 V), they have to be used in the configuration of the GPIs.*

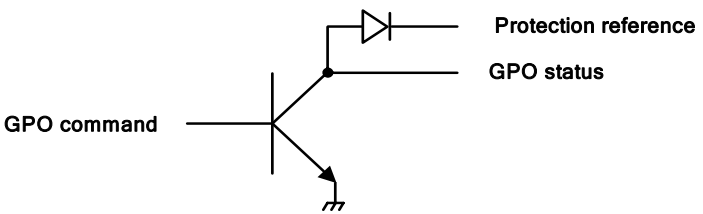


General Purpose Outputs (GPOs)

The ES220(-L) GPOs are "open collector" outputs. They use the same reference for 0 V and the same protection reference. The protection reference must be connected to the highest potential that may ever be connected to GPOs.

The GPOs respond to commands of the configuration and management software sent by the Primary Master. If written at "1", the GPO closes the linked open collector. If written at "0", the GPO opens the linked open collector.

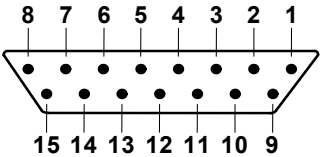
Note: *Pin 6 being connected to ground (0 V) and pin 11 being used as protection reference for the GPOs, they have to be used in the configuration of the GPOs.*



GPO open collector specifications

Maximum power switching capability all GPOs included	1 W
Maximum switching current (DC) per GPO	500 mA
Maximum switching direct voltage	50 V

Pinout



15-pin Sub-D connector

Pin #	Signal	Pin #	Signal
1	VCC	9	Reserved
2	Reserved	10	Reserved
3	Reserved	11	common OUT
4	IN 0	12	IN 1
5	IN 2	13	IN 3
6	Ground	14	OUT 0
7	OUT 1	15	OUT 2
8	OUT 3		

APPENDIX E: SETTING THE INTERNAL JUMPERS.

These settings shall be executed by qualified personnel only!

Tools required:

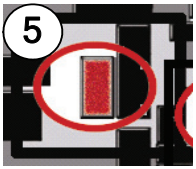
- a #1 Pozidriv screwdriver 
- an ESD-preventive wrist strap
- a small flat blade screwdriver

Electrostatic discharge (ESD) can damage several components on the board. To avoid such damage in handling the board, take the following precautions:

Bring the device and everything that contacts it to ground potential by providing a conductive surface and discharge paths. As a minimum, observe these precautions:

- Disconnect all power and signal sources.
- Place the device on a grounded conductive work surface.
- Ground yourself via a grounding wrist strap or by holding a grounded object.
- Ground any tools that will contact the device.
- Unscrew the eight flat-head Pozidriv screws (four on top-side, four on bottom-side) counterclockwise  and open the cabinet.

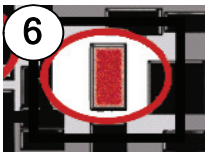
IN/OUT selection (ES220-L only)



IN/OUT selection
(ES220-L only)

This jumper defines whether the ES220-L injects two audio channels into the EtherSound stream (mode “IN”, jumper OFF) or whether it plays two channels provided by the EtherSound stream (mode “OUT”, jumper ON).

End of bi-directional loop

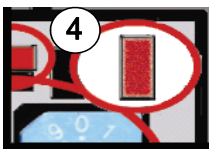


End of
bi-directional loop

This jumper is only taken into account if the rotary switches are positioned between 01 and 64. Otherwise, this parameter setting is done remotely by control software.

With this jumper ON, the ES220 or ES220-L is defined ‘end of bi-directional loop’. In this case the ES220 transmits the descending stream (“downstream”) to the following equipment, but it also sends the same stream to the equipment upstream, provided that it is the last device of the bidirectional chain. Several consecutive devices of a bi-directional chain may have this jumper in place. In this case, the bi-directional chain ends at the last device having this jumper ON.

Audio extraction (downstream/upstream)



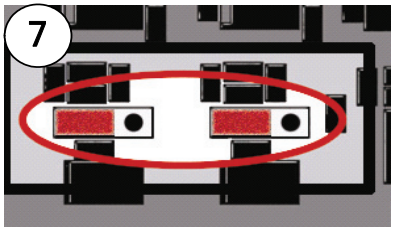
Audio
extraction
("downstream/upstream")

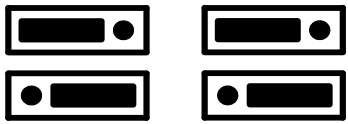
With this jumper ON, the ES220 (or ES220-L in mode “OUT”) plays back the two channels extracted from the ascending stream; if this jumper is removed, the two channels are extracted from the descending stream.
This jumper is only taken into account if the rotary switches are positioned between 01 and 64.

Audio insertion

Audio insertion upstream/downstream is handled exclusively by control software. In hardware mode, the audio is always inserted into the descending stream.

Nominal input level (ES220, ES220-L in mode "IN"/Master)





+4 dBu

-10 dBV
(approx. -8 dBu)

Input levels

Jumper position	Nominal input level	Maximum input level
	+4 dBu	+22 dBu
	-10 dBV (~ -8 dBu)	+10 dBu

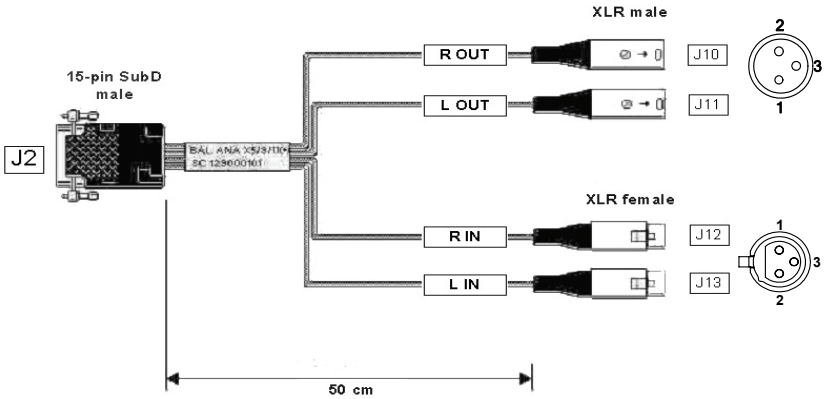
Jumper positionning
This setting defines whether the nominal level of the analog signals is either – 10 dBV (nominal level called "*Consumer*") or +4 dBu ("Professional"). Default setting is +4 dBu for all inputs.

The settings described above relate to ES220 and ES220-L in mode "IN" (*Master*), since they act upon the nominal input level. Having located the pair to modify in the overview (*annexe A*), Set the jumpers according to the above illustrations to match the requirements of your system.

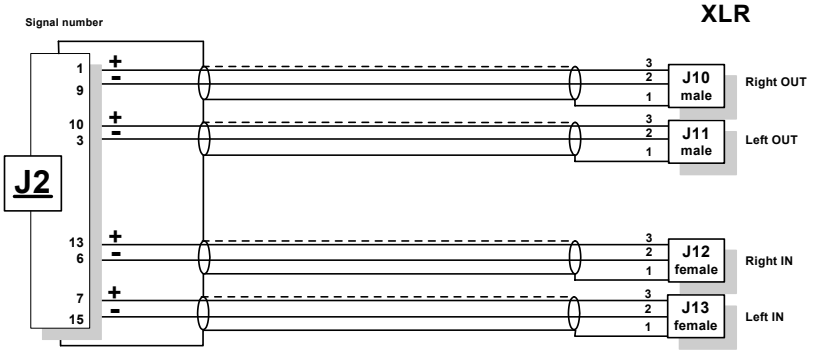
APPENDIX F: CABLES

ES220: analog cable delivered by Digigram (optional):

Schematic diagram of the cable delivered by Digigram:



Wiring diagram – analog cable ES220

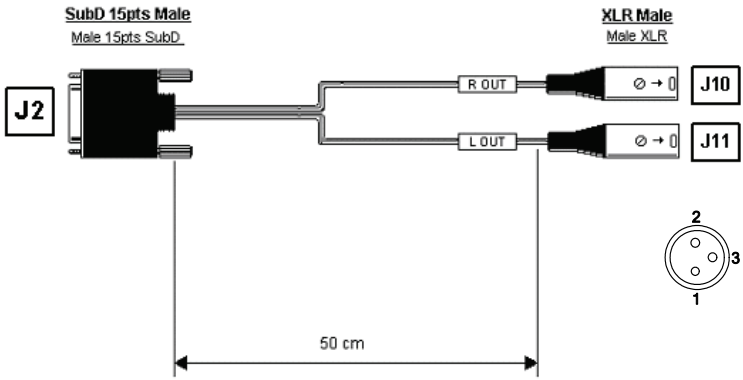


Wiring - analog cable with 2 inputs / 2 outputs (ES220)

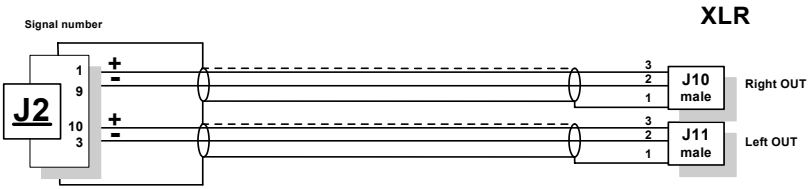
Pin #		Pin #		Pin #	
1	R OUT +	6	R IN -	11	GND
2	GND	7	L IN +	12	NC
3	L OUT -	8	GND	13	R IN +
4	GND	9	R OUT -	14	GND
5	NC	10	L OUT +	15	L IN -

ES220-L: analog cable with 2 outputs (*optional*):

Analog cable delivered by Digigram:



Wiring diagram – analog cable with 2 outputs ES220-L

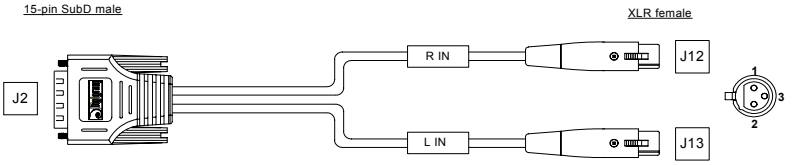


Wiring – analog cable with 2 outputs ES220-L

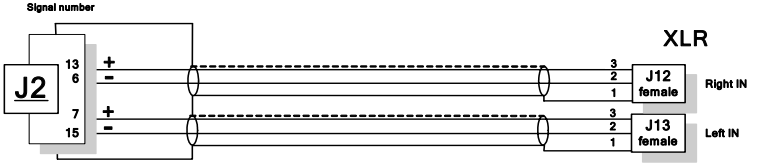
Pin #		Pin #		Pin #	
1	R OUT +	6	NC	11	GND
2	GND	7	NC	12	NC
3	L OUT -	8	GND	13	NC
4	GND	9	R OUT -	14	GND
5	NC	10	L OUT +	15	NC

ES220: analog cable with 2 inputs (*optional*):

Schematic diagram of the cable delivered by Digigram:



Wiring diagram – analog cable with 2 outputs ES220



Wiring – analog cable with 2 outputs ES220-L

Pin #		Pin #		Pin #	
1	NC	6	R IN -	11	NC
2	NC	7	L IN +	12	NC
3	NC	8	GND	13	R IN +
4	NC	9	NC	14	GND
5	GND	10	NC	15	L IN -

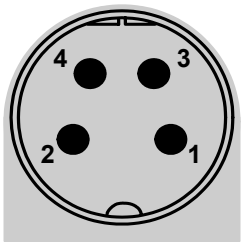
APPENDIX G: POWER SUPPLY

Each ES220 and ES220-L is delivered with a counterpart for the Mini DIN 4 connector. A complete power supply is available optionally.

Lockable 4-pin Mini DIN plug:

Pin assignment view →

View on the pin assignment of the counterpart plug:



Pins 3 and 4 connected to 5 VDC

Pins 1 and 2 connected to GND (0 V) and shield

Your notes: