Ether
ES
Sound

EtherSound ES881

EtherSound ES1241

EtherSound ES16161

ES881
ES1241
ES16161

USER'S MANUAL
MANUEL UTILISATEUR

Digigram

Networking Your Sound

EtherSound ES881, ES1241 & ES16161
Ethernet Audio Bridges

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 dans ce manuel ne sont pas couverts 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 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.

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 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.

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 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.

TABLE OF CONTENTS

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:	Electromagnetic Compatibility:
Europe : EN60950, 3rd edition	Europe: EN55022:1998 + A1:2000, Class B / EN55024 : 1998 + A1:2001
European Directive 73/23/CEE "Low Voltage Directive"	European Directive 89/336/CEE on electromagnetic compatibility
International: IEC 60950, 3rd edition	International: CISPR22:1997 + A1:2000 CLASS B
	United states: FCC rules-Part 15 Class B (digital device)

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.

The limits specified in the standards 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 installed and used in accordance with the instruction, 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 the 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 audio/television technician for help.

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.*

You have just acquired a Digigram EtherSound audio bridge and we congratulate you!

Digigram EtherSound ES881 / ES1241 / ES16161 are equipped with AES/EBU interfaces including hardware sample rate converters (SRC). They allow the realization of flexible and powerful EtherSound networks.

The manual at hand will guide through installation and operation. For any software related issue, please refer to the specific documentation provided in its on-line help.

For more information on EtherSound networks and wiring recommendations please consult the document 'Creating EtherSound Networks' (English), available on the enclosed CD-ROM or on our web site.

KEY FEATURES

ES881 :

- 4 AES/EBU digital stereo inputs inserted into 8 EtherSound channels
- 4 AES/EBU digital stereo outputs extracted from 8 EtherSound channels

ES1241 :

- 2 AES/EBU digital stereo inputs inserted into 4 EtherSound channels
- 6 AES/EBU digital stereo outputs extracted from 12 EtherSound channels

ES16161 :

- 8 AES/EBU digital stereo inputs inserted into 16 EtherSound channels
- 8 AES/EBU digital stereo outputs extracted from 16 EtherSound channels

- 1 Word Clock input
- 1 Word Clock output
- 19" 1 RU enclosure
- Remote control and management via 'EScontrol' software
- XLR connectors   (ES16161 : 4 Sub-D 25-pin connectors)

OVERVIEW
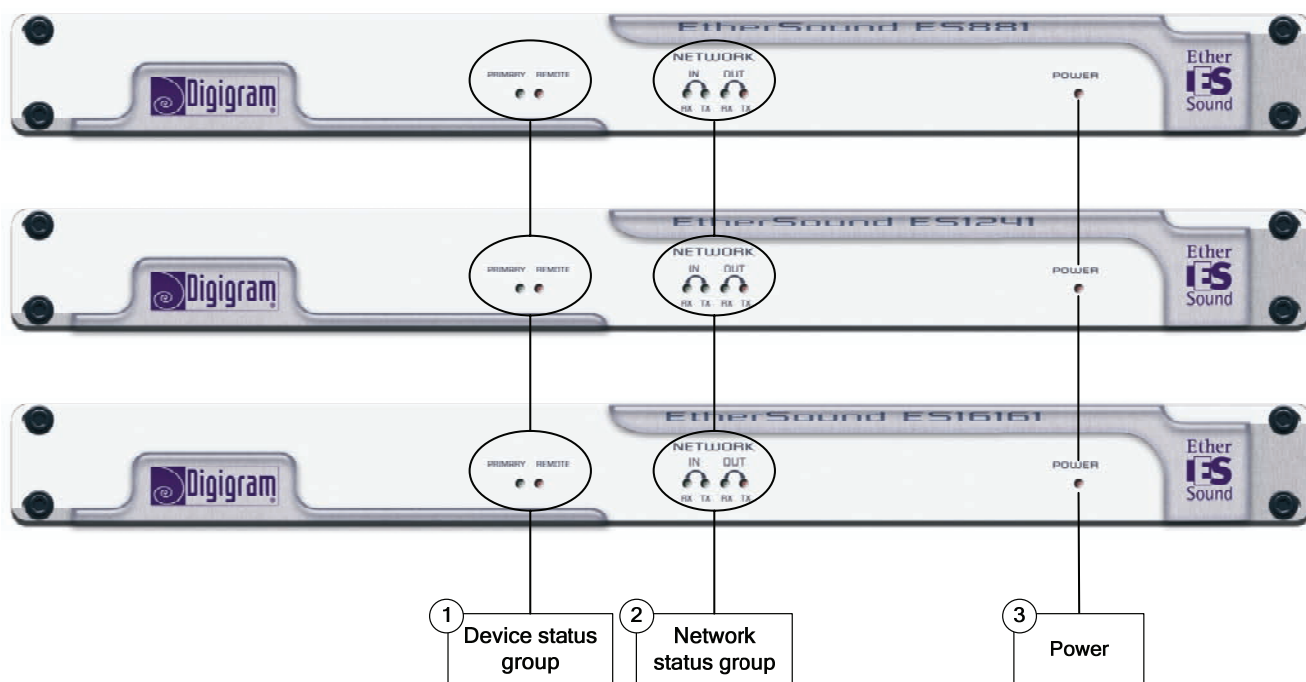
Contents of this package

The package consists of the following components:

- one ES881, ES1241 or ES16161 1U 19 inch rack device
- a power cord
- counterparts for the GPIO terminal blocks
- the User's Manual at hand
- a CD-Rom with configuration and control software

The ES881, ES1241, and ES16161 front panels

1. **Device status group (two orange LEDs):**

   Primary
   The first LED is called "Primary". It shines when the device is the first *'Master'* device in the EtherSound network, thus the *'Primary Master'* of the EtherSound network (see document on EtherSound for more details on the *'Primary Master'* concept)

   Remote
   The second diode is called "Remote", it indicates that the configuration of the EtherSound channels is carried out remotely

2. **Network status group**
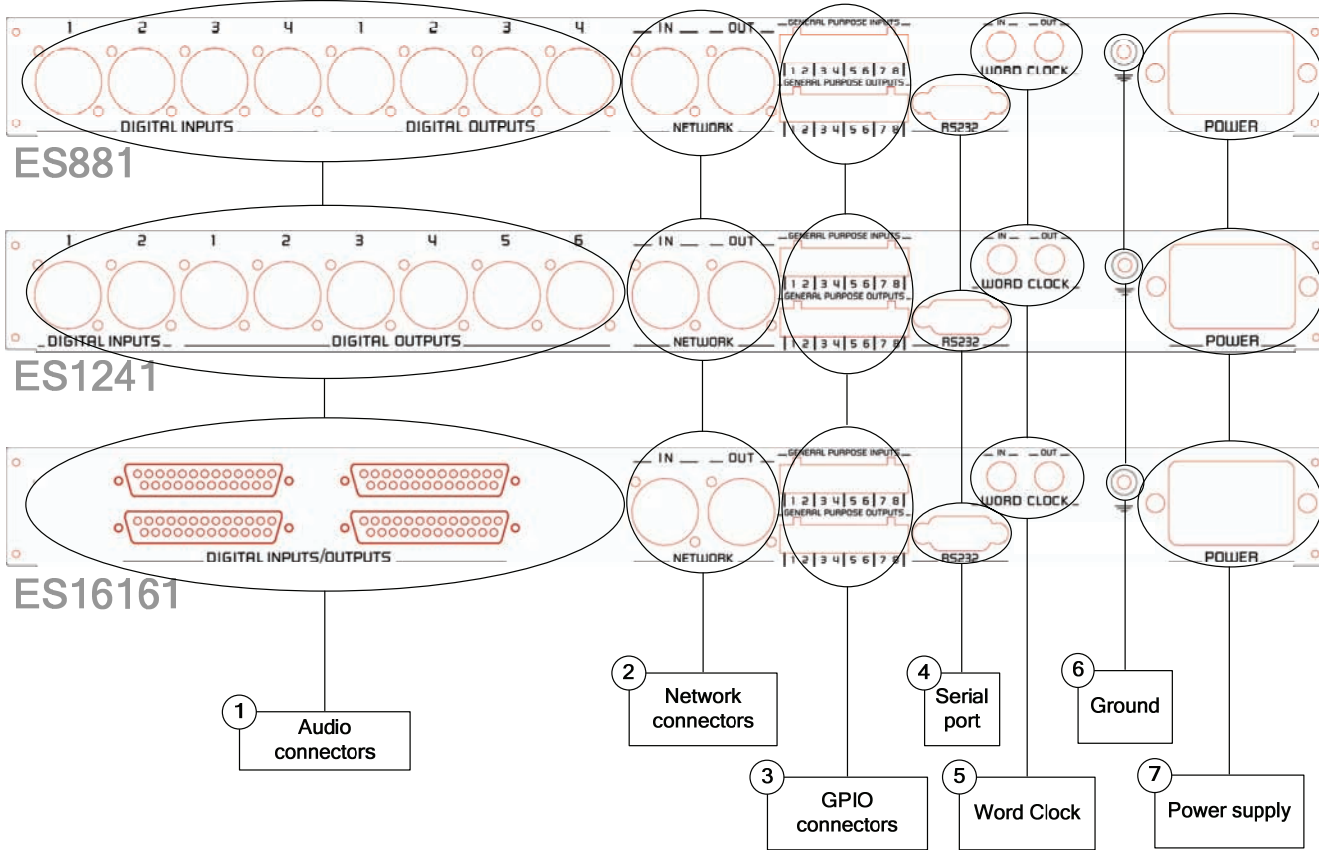   These four green diodes light up when the devices are connected to the EtherSound network; as soon as a network activity is detected, they start to flash indicating an activity on the two Ethernet ports ("IN" and "OUT"); RX flashing means that data are received while TX flashing means that data are transmitted.

3. **Power**
   This LED simply shows that the device is up and running!

ES881, ES1241, and ES16161 back panels

1. **Audio connectors**

   On ES881, four male XLR-3 connectors are used to output eight EtherSound channels on four AES/EBU stereo outputs, four female XLR-3 connectors to input eight EtherSound channels on four AES/EBU stereo inputs.

   On ES1241, six male XLR-3 connectors are used to output twelve EtherSound channels on six stereo AES/EBU stereo outputs, two female XLR-3 connectors to input four EtherSound channels on two AES/EBU stereo inputs.

   On ES16161, two female Sub-D 25-pin connectors are used to output sixteen EtherSound channels on eight stereo AES/EBU stereo outputs, two female Sub-D 25-pin connectors to input sixteen EtherSound channels on eight AES/EBU stereo inputs.

2. **Network connectors**

   These two Neutrik™ EtherCon™ RJ45 connectors allow of a steady and reliable connection to the EtherSound network. The "IN" port receives the descending EtherSound stream ('*downstream*', coming from the '*Primary Master*') while the "OUT" port receives the ascending EtherSound stream ('upstream') and transmits it to the "IN" port; for more details on the concepts of '*upstream*' and '*downstream*' please refer to the document '*EtherSound Overview*', available on the enclosed CD-ROM and on our web site.

3. **GPIO connectors**

    These terminal blocks allow setup of external control and monitoring devices through configurable and protected General Purpose Inputs and Outputs. See dedicated GPIO chapter for details.

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

4. **Serial port**

    RS232 interface on DB9.

    Note: *The RS232 serial port management requires specific software.*

5. **Word clock synchronization**

    Two female BNC connectors , 'Word Clock In' and 'Word Clock Out', allow synchronization with an external clock. For more details see the corresponding chapter.

6. **Ground**

    Connect this ground bolt to the chassis of the mounting rack for a better grounding of the electronics, thus ensuring immunity to electromagnetic interference.

7. **Power supply**

    Power plug MUST be earthed properly.

INSTALLATION

Before mounting devices in a rack...

Internal settings

On ES881, ES1241, and ES16161 the local sampling frequency is switchable by means of a jumper between 44.1 kHz and 48 kHz.

Preset default value is 48 kHz.

In case you need to change the default setting, please refer to appendix B of this manual.

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

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.

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 cable type most commonly used today is CAT5e. For more detailed information, please refer to the document "*Building ES Networks*", available on the enclosed CD-ROM and on our web site.

The network connections are established via two Neutrik™ EtherCon™ RJ45 receptacles. Connection is very easy: use the connector labeled "IN" to connect the descending EtherSound stream (*downstream*, coming from the '*Primary Master*'), the connector labeled "OUT" to connect the ascending EtherSound stream ('*upstream*').

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.

Example 1: bi-directional point-to-point transmission of eight audio channels

This application is very easy with EtherSound ES881, ES1241, and ES16161.

Connect a standard Ethernet cable between the "OUT" port of the first Ethernet bridge to the "IN" port of the second Ethernet bridge. Bring into line the EtherSound channels on the two devices (see the on-line help of the configuration software).

Example 2: more complex architectures

System topology may be *daisy chain*, star, or a combination of both. By default, the first device in a network, such as an EtherSound ES881, provides the master clock for the entire network. Nevertheless, you have the possibility to synchronize the '*Primary Master*' on an external clock by using the '*Word Clock In*' input and by then providing this clock to the EtherSound bridges downstream from the '*Primary Master*' passing through the '*Word Clock Out*' outputs.

Connect the "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 is 100 meters (328 feet). Intermediate switches or fiber optic links may be used to considerably increase this distance.

Synchronization

ES881, ES1241, and ES16161 support several synchronization modes.

Synchronization via:

- the network (except in '*Primary Master*' mode)
- the 'AES In 1' input
- the Word clock input

If the equipment is ` Primary Master', it provides the clock for the network It can be synchronized on the internal clock or on the signal connected to the "AES In 1", or on the signal connected to the Word Clock input. In the last case, these input signals must be synchronized with the Word Clock. If they are not synchronized, it is necessary to insert a frequency conversion stage (SRC) from the configuration software. Likewise, the insertion of the SRC is obligatory in the case of synchronization on the internal clock.

When the device is not in 'Primary Master' mode, it is synchronized on the signal coming from the network:

- the '*Word Clock Out*' output allows synchronizing the devices connected on the 'AES In 1' inputs. In this case it is not necessary to insert an SRC stage.
- If the devices connected to the AES/EBU are not synchronized on the network, sample rate conversion (SRC) is required.

Use the configuration software provided to set these parameters.

Connecting a computer to manage the EtherSound network

To connect a PC directly to an ES881, it must be equipped with a network card. Use an Ethernet cable to connect the network card to the "IN" port of the Primary Master.

You can as well access the Primary Master through a regular Ethernet network.
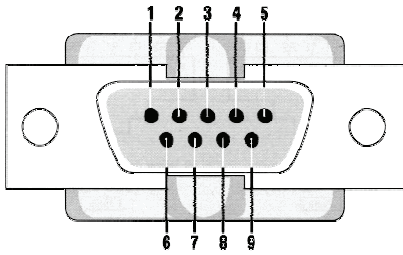
Audio

The pinout used on the XLRs is standard: pin 1 carries the signal ground, pin 2 carries the positive signal ("hot", +) and pin 3 carries the negative signal ("cold", -).

GPIO

ES881, ES1241, and ES16161 are shipped with four GPIs and four GPOs on terminal blocks, counterparts are supplied. For details see Appendix A.

Serial port (RS232 on DB9)

Pin #	Description
1	not connected
2	RxD (received data)
3	TxD (transmitted data)
4	not connected
5	signal ground
6	not connected
7	RTS (request to send)
8	CTS (clear to send)
9	not connected

ES881, ES1241, and ES16161 dispose of a serial ES16161 RS232 male port on the rear panel. Use this port to connect any compatible device. For pinout allocation details, please refer to the figure and table above.

Note: *The RS232 serial port management requires specific software.*

Remote set-up by means of configuration software

Use of the configuration software allows for the management of all devices on the EtherSound network; for software details, please refer to the on-line help file.

ES881, ES1241, and ES16161 are shipped with a CD-ROM containing the EtherSound driver and the Digigram configuration software, EScontrol. To install this software, you must first add the EtherSound driver to your system. A window lists the instructions you must follow to achieve this step.

Next, launch *setup.exe* on a PC connected to an EtherSound network. An InstallShield Wizard will guide you through the installation process.

ES881, ES1241, and ES16161 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	1U 19" rack : 43.9 x 482.6 x 297.1 mm
Power supply	100 - 240 VAC, 47-63 Hz switching-mode, automatic voltage detection *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	ES881/ES1241/ES16161 : 0.23 A at 100 V, 0.125 A at 240 V
Net weight	~3,1 kg (~6.85 lbs)

Entrées/sorties

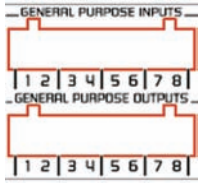|	EtherSound ES881	EtherSound ES1241	EtherSound ES16161
Digital audio AES/EBU 3	4 stereo inputs 4 stereo outputs	2 stereo inputs 6 stereo outputs	8 stereo inputs 8 stereo outputs
	With one hw sample rate converter per input, conversion ratio 1:3 to 3:1, up to 96 kHz		
Impedance	110 Ω	110 Ω	110 Ω
Sampling frequencies available	48 kHz or 44.1 kHz		

Connectivity

	EtherSound ES881	EtherSound ES1241	EtherSound ES16161
Digital audio	4 female XLR-3 and 4 male XLR-3	2 female XLR-3 and 6 male XLR-3	4 female Sub-D 25
EtherSound	2 female EtherCon RJ45 compatible (connections "IN"/"OUT")		
GPIO	4 optocoupled inputs and 4 relay outputs on 8-point terminal blocks		
Serial ports	1 RS232 on DB9		

Synchronization

Clock source	If 'Primary Master' in an EtherSound network: Internal, Word Clock or on 'AES IN 1' input
	If not 'Primary Master': EtherSound network, Word Clock or on 'AES IN 1' input (synchronized on the *'Primary Master' clock*)

APPENDIX A: GPIO CONNECTORS

ES881, ES1241, and ES16161 feature four optocoupled GPIs and four relay GPOs. GPIs allow sending commands to the EtherSound configuration software, GPOs can be used by the EtherSound configuration software for remote control of external devices.
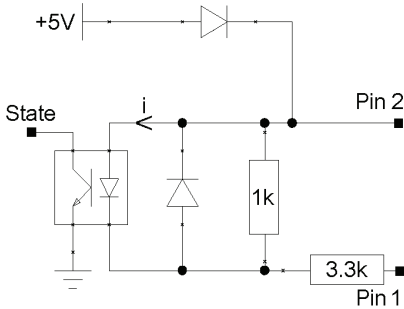
The GPIO pins are labeled 1 through 8 on the rear panel as illustrated.

General Purpose Inputs (GPIs)

Schematic diagrams show the particular design for each GPI. The GPI status can be either "1" or "0". It is read "0" as soon as the system connected to the GPI creates the current labeled "i" on the scheme. Otherwise it is read "1". Different GPI designs allow for multiple ways to establish this current, thus offering utmost flexibility in system configuration to best meet your needs.

Note: *Pin 2 delivering +5 V electric potential and pin 4 being connected to ground may also be used in the configuration of other GPIs.*
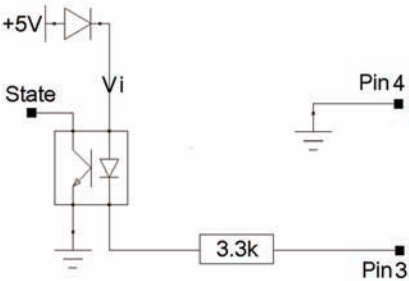
GPI #1

GPI #1 uses pins 1 & 2

Pin 2 delivers +5 V electric potential. This pin may serve as a source to create a current flow for GPI #3 and GPI #4.

Switching the GPI state to 0:

Pin 1 is to be connected to ground to establish the "i" current, typically by connecting it to pin 4.
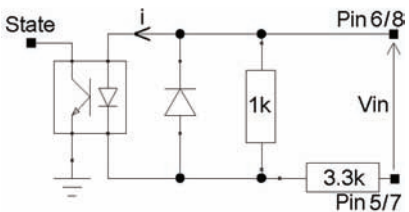
GPI #1

GPI #3 uses pins 1 & 4

Switching the GPI state to 0:

Pin 3 is to be connected to ground to establish the "i" current, typically by connecting it to pin 4.

GPI #3 & GPI #4

GPI #3 uses pins 5 & 6, GPI #4 uses pins 7 & 8.

Switching the GPI state to 0:

A current flow is to be established from pin 6 to pin 5 (GPI #3) or from pin 8 to pin 7 (GPI #4).

GPI optocoupler specifications

$_{min}$imum current i_{min} to switch GPI	0,5 mA
Maximum current i_{max} supported	50 mA
i calculation rule (GPi #3 & #4)	$i \text{ (mA)} = \dfrac{V_{in} - 1,2}{3,3}$
Maximum voltage V_{in} supported	50 V_{dc}
Maximum reverse voltage V_{in} supported	6 V

General Purpose Outputs (GPOs)

The ES8 GPOs are relay outputs. They feature two pins each and are all configured the same way. Pins 1 & 2 belong to GPO #1, 3 & 4 to GPO #2, 5 & 6 to GPO #3, and 7 & 8 to GPO #4.

It responds to commands of configuration and management software sent via 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.

GPO relay specifications

Maximum power switching capability	10 W
Maximum switching current	500 mA_{dc}
Maximum carrying current	1 A_{dc}
Maximum switching voltage	100 V_{dc}
Typical life expectancy (switching max power)	10^6 operations

APPENDIX B: SETTING THE INTERNAL JUMPER

These settings shall be executed by qualified personnel only!
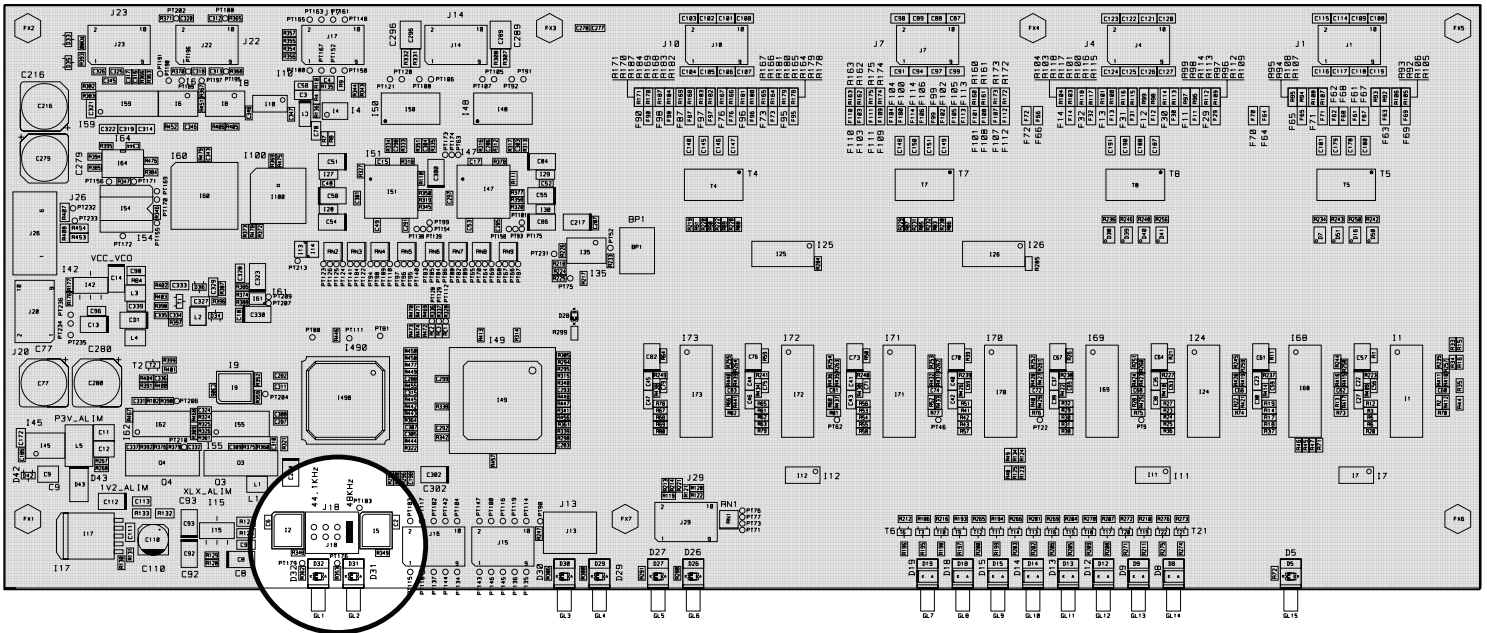
Tools required:

- 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.
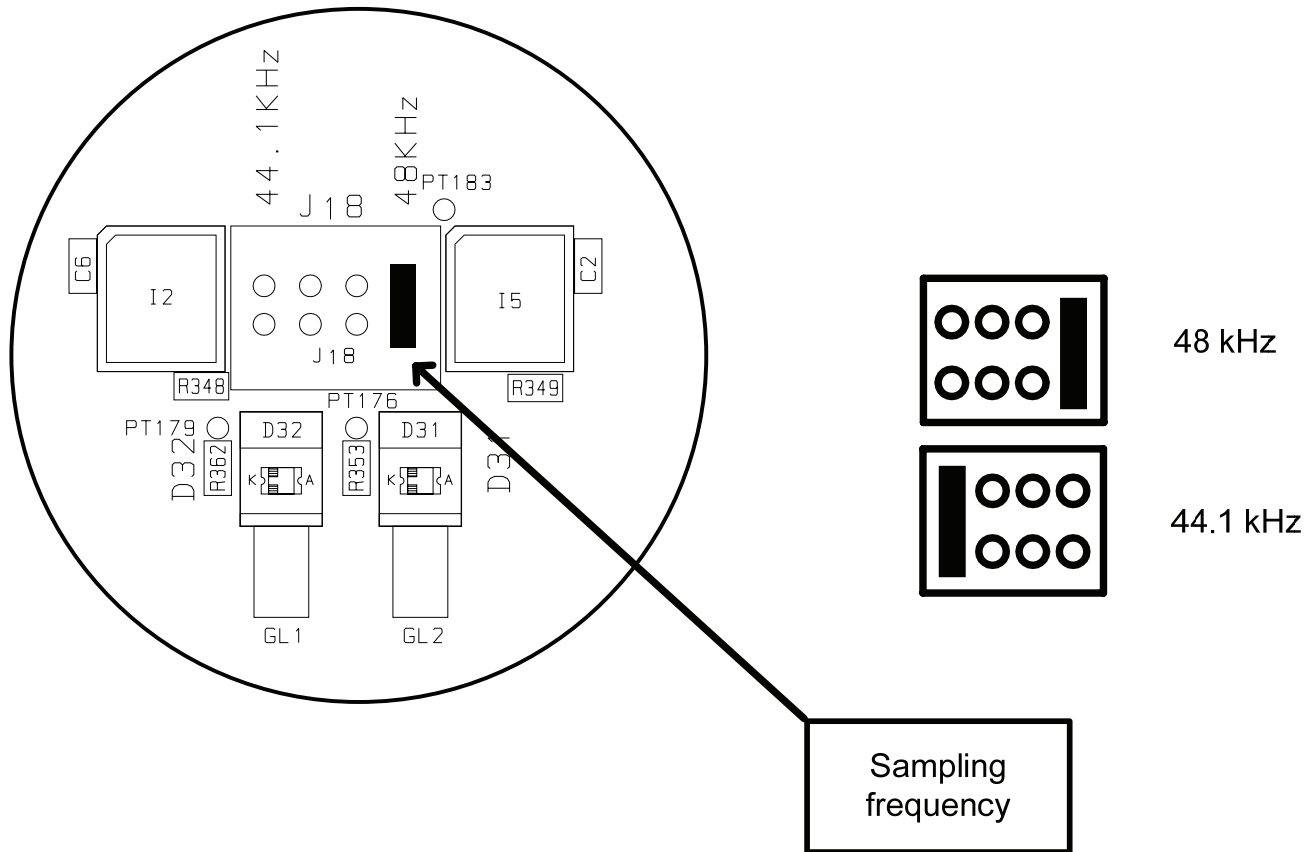
Jumper location on the main board

Selct sampling frequency

48 kHz

44.1 kHz

Sampling frequency

This jumper allows for modification of theES881, ES1241, and ES16161 sampling frequency. The default value is preset to 48 kHz. It can be set to 44.1 kHz. Note that this setting is effective only if the ES881 is the Primary Master of the EtherSound network, as the Primary Master is the device providing the clock for the entire network. In case the EtherSound bridge acts as "common" Master or Slave device, the sampling frequency is determined by the incoming EtherSound stream (synchronized on the *Primary Master* clock). Modifications on devices other than the Primary Master will be ignored.
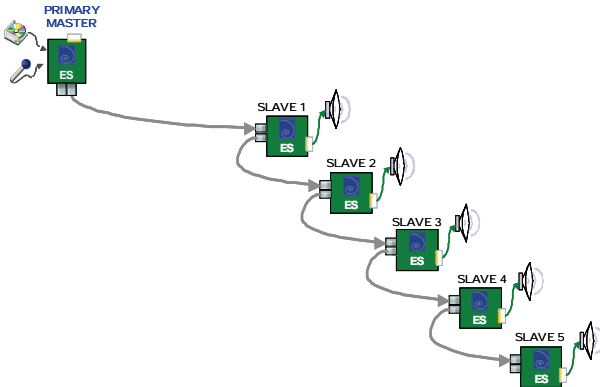
APPENDIX C: GLOSSARY

AUDIO CHANNEL

An audio channel is a single mono audio signal. By extension, an audio channel is one of the 64 slots of an EtherSound frame, i.e. a signal sampled at 48 KHz with a 24-bit resolution.

SWITCH

Device to connect two segments of a **L**ocal **A**rea **N**etwork. Seeking greater filtering and forwarding speeds, efforts were made to decrease the amount of time required to determine if a packet should be filtered or forwarded ('latency') by only examining the address information contained at the start of the Ethernet frame. The term 'Ethernet Switch' now is used for multiple-port-devices, which are able to filter and forward packets at nearly the speed of Ethernet ('wire speed') regardless of the technique.

DAISY CHAIN

The daisy chain is a network topology where all devices are linked "serially".

GPIO

General Purpose Inputs Outputs. Each ES8 device has four GPIs and four GPOs. GPOs can be fully configured to remotely control external devices. GPIs can be used to receive commands from external devices.

MASTER

A *Master* is a device contributing audio channels into the EtherSound network. It is located downstream from the *Primary Master*.

A *Master* answers to the status requests and commands of the *Primary Master*. See also *Primary Master*.

PRIMARY MASTER

The first EtherSound device in the network is called the Primary Master. As well as being a source of audio for the network, the Primary Master provides the commands and the clock for audio channel synchronization.

The *Primary Master* may also serve as the link between the EtherSound network and configuration software running on an external computer, connected to its Ethernet FROM port.
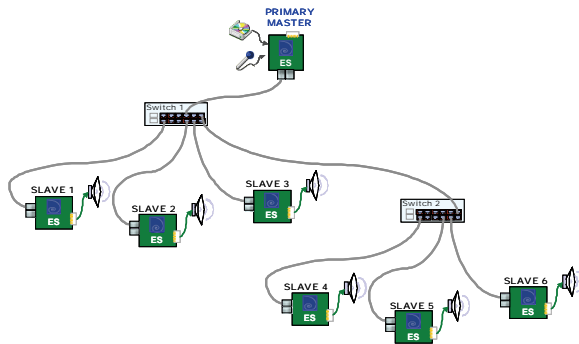
SLAVE

An EtherSound device that receives the EtherSound stream and restores standard audio is called a **Slave**.

A *Slave* answers to the status requests and commands of the *Primary Master*.

STAR

Star is a network topology where all devices are connected to a same unit (a switch in the following picture) that is handling all the communications.

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Networking Your Sound

Digigram SA

(Serving Europe, Africa, Middle East, Latin America)
Parc de Pré Milliet 38330 Montbonnot-FRANCE
Tel: +33 (0)4 76 52 55 01 • Fax: +33 (0)4 76 52 53 07
E-mail: sales@digigram.com

Digigram Inc.

(Serving North America)
2101 Wilson Boulevard, Suite 1004,
Arlington, VA 22201-USA
Tel: +1 703 875 9100 • Fax: +1 703 875 9161
E-mail: input@digigram.com

Digigram Asia Pte Ltd.

(Serving Asia and Australia/Oceania)
350 Orchard Road - #19-07 Shaw House Singapore
238868-SINGAPORE
Tel: +65 6291 2234 • Fax: +65 6291 3433
E-mail: info_asia@digigram.com

www.digigram.com